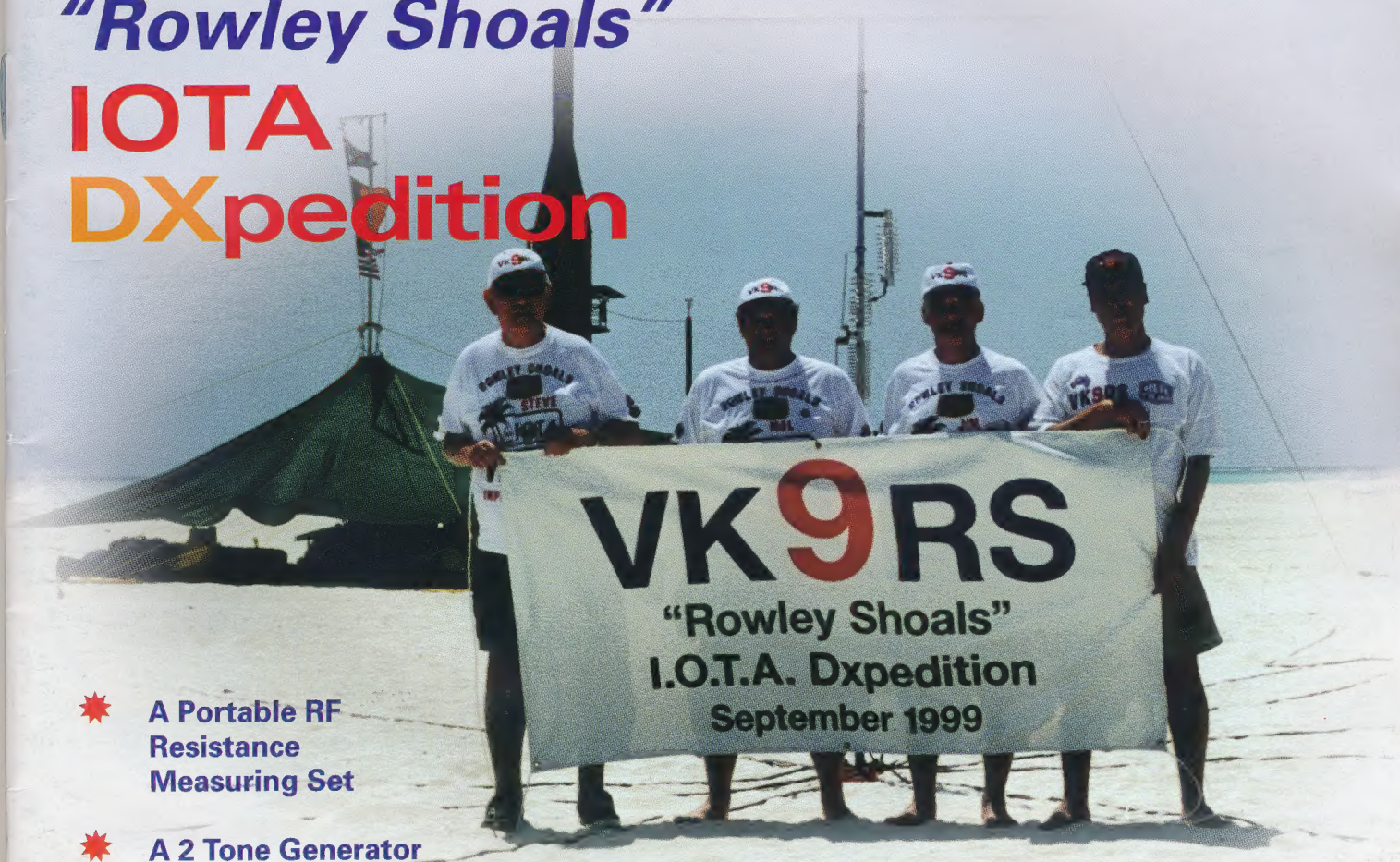
March 2000
Volume 68 No 3

Amateur Radio

"Rowley Shoals" IOTA DXpedition



- A Portable RF Resistance Measuring Set
- A 2 Tone Generator for Testing SSB Transmitters

PSK31
the easy way

The need for a new AR communications system that is more efficient in spectrum occupancy has become vital for the continued expansion of the AR service

Eric Jamieson VK5LP
Looks back at an Expanding World

plus

ALARA, WIA, Divisional & Club News & regular columns

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Amateur Radio

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Our cover this month

VK9RS "Rowley Shoals" IOTA DXpedition, September 1999
Left to Right: Steve VK2PS, Mal VK6LC, Jim K9PPY, Sam CY1EEN
(See story page 12)

Contributions to Amateur Radio
Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, How to write for Amateur Radio is available from the Federal Office on receipt of a stamped self-addressed envelope.

Back Issues
Back issues are available directly from the WIA Federal Office (until stocks are exhausted, at $4.00 each (including postage within Australia) to members.

Photostat copies
When back issues are no longer available, photocopies of articles are available to members at $2.50 each (plus an additional $2 for each additional issue in which the article appears).

Disclaimer
The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

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Founded 1910

Representing
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Member of the
International Amateur Radio Union

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EDITORS COMMENT

Making the most of new challenges

Getting AR to you is much more complicated than I ever imagined. My February copy arrived, outer Adelaide metropolitan area, 8 days after it went to Australia Post in Melbourne on 10th February.

There have been a number of articles recently on Morse Code, but there are other modes that are not widely used and of which all of us should have a little knowledge. You never know who might be looking for a new challenge. A few years ago I would not have dreamt that I would have a VHF station and a packet capability. Then neither did I think I would have a need for a TH3 !.

I would like some articles on packet or digital communication in general. We have an article on PSK31 in this issue. How about an article on the use of this module or similar units from users ?

How about UHF construction ?. SA Equipment supplies has some good kits. I had a query, from a friend of one of my sons, about how to get information on these kits. The query came from a RAAF base.

There is also a need for photographs. Not that we print anything that comes. You may have got that impression but a magazine can only be assembled from what is submitted. There have been some problems in the past about acknowledging material submitted for publication. I am hoping we now are acknowledging receipt by return mail and giving the author the reference number for the article in the AR articles register. We have a few article which have been a while in the vetting process and a few, which in the moves between Victoria, Queensland and South Australia, have been mislaid (I hope). We will use all the material that was submitted more than 6 months ago in the next few months. So there is room for more. I would like to be able to publish issues with themes but there is not enough material to do that at present.

The *Over To You* column is for your views. There is need for an open WIA discussion area. We need views on what the WIA does well and what it does not so well. Criticism is the lifeblood of any organisation, but it has to be constructive. I have read lots of "stuff" on my local packet BBS about the WIA. So I would like to see discussions based in the present and not what Joe ??, who was the WIA ??, did in 1960 being the reason why Bill ?? cannot support the WIA today. Different people different time. Let us accept change and learn to work with it.

Colwyn VK5UE

ar

Thought for the month :-

Learn something new. See if it is really that hard to work on a new band or use a new mode.

Errata *An Experimental LF Band Transmitter* February 2000 pages 20 to 27.

1. VK5HK is referred to in the article as Harry Krause; he uses the name Harro. We apologise for renaming you Harro. A reviewing error.
2. A 25 ohm load is discussed through out the article. On page 20 last para. and on page 26 first para. under "Dummy Load" a 20 ohm load is referred to. All should be 25 ohm.
3. The Minifin heatsink is discussed on page 25 at the top. Its thermal resistance was stated as about 1 degree C per watt. However the calculations were done with the more accurate value 1.3 degree per watt and 0.1 for the insulating washer. The difference is 56 degree rise in one case and 44 degree in the other, a significant difference.
4. In second last line in center column page 26 the "4 to 4 amperes" should be "4 to 5 amperes"
5. Lloyd also told us he had had feedback on his assumption of 1 ohm for ground resistance being too low. Earth mats are usually restricted in size and so higher values are normal. However at the ex VIA site the 150ft mast has a mat of 120 radials each 738ft(225m). AR Oct 1998 has an article on the site. In this case 1 ohm is not unreasonable.

Thank you Lloyd for supplying these corrections.

ar

WIA News

Compiled by Richard Murnance VK2SKY
Federal News Coordinator

Rapid access to WIA News on Web

Since the inception of the WIA Federal web site, WIA News culled from Amateur Radio magazine has been copied to its own monthly page on the web. While it forms a useful web-accessible archive of news, by the time it has appeared on the web site it has in many cases lost some of its currency. In the meantime, many distorted and quite often wildly incorrect versions of the news, from unofficial and often poorly informed sources, have circulated both on Internet and the Amateur packet radio network.

For 2000, we are adopting a new format, where the latest news is added to the web site as it comes to hand throughout the month (with a tip of the hat to Graham Kemp VK4BB and the VK4 Division's "Q-tinuous" news service.

Each month, the news items are archived to a separate page on the site and forwarded for inclusion of the next edition of *Amateur Radio* magazine. This will give Amateurs more rapid access to important news on the Amateur Radio scene, and hopefully reduce the spread of unofficial versions of the news.

Drop Morse test speed to 5 wpm: WIA in VK1

WIA moves towards dropping Morse test speed to 5 wpm The VK1 Division of the WIA has decided, by an overwhelming 5/6 majority to favour the drop of the AOCP Morse-speed requirements to 5 WPM. A lively discussion has now ensued about a possible omission of the Morse code requirement for an HF-type license altogether, which could happen at the next WARC conference. (VK1news via QNEWS)

According to the VK3 Divisional web site in early February, the majority of WIA Divisional Councils support reducing the Morse test speed to 5wpm. VKs 1, 3, 5, and 6 had already declared their support for the change; VKs 2 and 4 "appear to be in agreement", and VK7 branches were still to determine their position at the time of writing this column.

continued next page

Comment

WIA Federal President, Peter Naish VK2BPN

This month I wish to again draw your attention to the important event that will take place in Darwin later this year. During the last week of August, the WIA will host the 2000 meeting of the International Amateur Radio Union (IARU), Region 3. These meetings are held every few years to debate important issues facing the amateur radio service and to make strategic policy decisions, which are aimed at strengthening our hobby. I believe that this is the first time that one of these meetings has been held in Australia.

There are many pressures on the amateur radio service worldwide. These include matters related to the very basis of amateur radio such as the international treaty under which the service is established. One of the most familiar of these is the need for Morse code proficiency, before one is permitted to use the HF bands. Other items for debate include international bandplans, the threat to our spectrum allocations, concern about diminishing numbers of radio amateurs and membership of national amateur radio societies, assistance in establishing amateur radio in emerging nations, requirements for EMC and EMR, and a host of other vital issues. The IARU is the international voice of amateur radio and the WIA is an active member on behalf of all Australian radio amateurs.

Work on preparing for the Darwin meeting has been going on for nearly a year now. The pace is picking up, with most of the administrative matters well in hand. As the host the WIA must ensure that the logistics and the preparations are carefully planned. The WIA is delighted that the Darwin Amateur Radio Club has been able to provide the vital "on-the-ground" support that is needed for an international convention of this nature. We will be welcoming some 100 delegates from IARU member countries throughout Region 3 that includes much of Asia and the Pacific basin.

The Region 3 meeting is a working activity, with some very serious international debate and argument. To prepare for this member countries submit papers on a range of subjects that concern them. Our delegates have the responsibility of progressing the Australian papers and arguing our case in working groups and plenary sessions. It is very hard work and certainly no holiday!

Just in case you are thinking that all this is fine, nothing needs to be done, let's wait to hear about the results, let me remind you that this meeting is our chance to promote our requirements in the international arena. We need to lead the cause, not merely follow the views of others. To this end, a number of papers on topical issues are being prepared by various WIA technical teams and coordinated through the Federal Council and its IARU Region 3 Coordinator, Grant Willis. It is not too late for you as a member of the WIA to have your say. How do you do this? Well, write to the Federal Councilor in your Division. This gives him the opportunity to pass your views onto the team for consolidation into the Australian submissions. We are a democratic organisation and we need to reflect the wishes of all Australian radio amateurs. Don't just sit back and let the few do all the work! High calibre persons will represent the WIA in Darwin but they need your support and your inputs. Give them the opportunity to be successful in every respect.

A little closer to the date, we will bring you more details of the Region 3 Meeting and a summary of the items that will be discussed. In the meantime, let's all work on this one to ensure the maximum benefit to our hobby.

ar

WIA News

continued from previous page

2001 - International Year of Volunteers

In November 1997, the United Nations General Assembly proclaimed 2001 as the International Year of Volunteers. To prepare for the year, the United Nations Volunteers programme (UNV) has been designated the international focal point. Aiming at increased recognition, facilitation, networking and promotion of volunteering, the International Year of Volunteers 2001 (IYV) provides a unique opportunity to highlight the achievements of the millions of volunteers worldwide. (I.e., Those people who devote some time of their lives to serving others) and to encourage more people globally to engage in volunteer activity.

For more information about the International Year of Volunteers (2001), visit: http://www.iyv2001.org/>

ACA Oks HF Gateways

Will VK6UU, speaking to the VK6 Division of the WIA, has said the Australian Communications Authority (ACA) have agreed in principle to the concept of "HF Gateway" services, subject to certain conditions.

A model licence application is now being prepared for the ACA to consider.
(VK6MTS, via QNEWS)

New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of October

MRS B EBBELING	
L21170	MR R O JONES
L31550	MR R LLOYD
L50752	MR R A PURVINSKIS
VK1YL	MRS R M WORTHINGTON
VK2HRM	MR R T MACKAY
VK2HV	MR P G HANNA
VK2KYG	MR N J JEFFRIES
VK2ZAB	MR G J MCDONALD
VK3BT	MR W MARTIN
VK5IK	MR I N COUSINS
VK5OK	MR L L ROSSITER
VK5PGH	MR G HUGHES
VK5WAM	MR A J MITCHELL
VK6HL	MR M A LANG
VK6NJ	MR J R COX
VK6RW	MR R O WORTHINGTON
VK6TB	MR T V BLAKEMORE
VK6WR	MR G M SELLEY
VK6YFD	MR M I ARMSTRONG
VK7HIL	MR W A STUBBINGS
VK7MO	MR R MONCUR

Hedy Lamarr actress and inventor: SK

Hedy Lamarr, the sultry, sexy screen star of the 1930s and 1940s who also conceived the frequency-hopping technique now known as spread spectrum, has died. Lamarr was found dead in her suburban Orlando, Florida, home January 19. She was believed to be 86.

Born Hedwig Kiesler in Austria, Lamarr came to the US in 1937 after being signed by MGM. Among her most successful films was the 1949, directed Cecil B. DeMille classic, *Samson and Delilah.*

In her 1992 book *Feminine Ingenuity*, Lamarr described how she came up with the idea of a signaling device for radio-controlled torpedoes that would minimize the danger of detection or jamming by randomly shifting the frequency. She and composer George Antheil developed the concept and received a patent for it in 1942.

The concept was not developed during World War II, but when the patent expired, Sylvania put the idea to use in satellites. Spread spectrum also has found applications in wireless telephones, military radios, wireless computer links, and Amateur Radio experimentation.

A more detailed version of Lamarr's role in spread spectrum is described in the IEEE book *Spread Spectrum Communications*, published in 1983.
(ARRL Special Bulletin number 1, 24 January 2000)

Amateur radio in the movies again

Another major motion picture featuring amateur radio has been released; this time, however, ham radio plays a central role in the movie, in a rather unusual way.

Frequency, starring Dennis Quaid, begins in 1969, as the solar cycle reaches its peak. Intense sunspot activity is causing some unusual effects down here on earth.

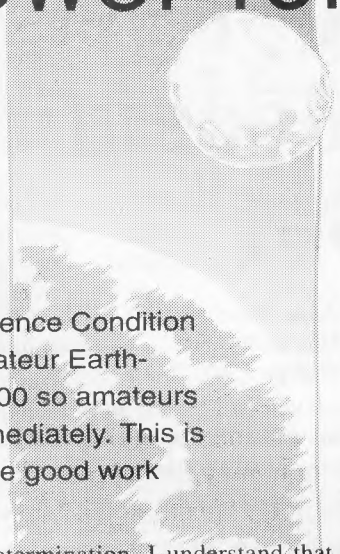
Quaid plays Frank Sullivan, a New York fire-fighter that shares with his six year old son Johnny a passion for baseball, rock and roll, and amateur radio.

Thirty years later, at the peak of a new solar cycle, John Sullivan is a homicide detective grieving the loss of his dead father. But the intense solar activity leads to what might be described as "exceptionally rare DX"...

At the time of writing the date for *Frequency*'s Australian release is not yet known. In the meantime, check out the *Frequency* web site, which features the detailed storyline and theatrical trailer videos, at www.frequencymovie.com

Other recent movies featuring amateur radio have been *Contact*, starring Jodie Foster, and *Phenomenon*, starring John Travolta.

ACA allows more power for MoonBounce



Peter Naish VK2BPN,
WIA Federal President
and
Richard Murnane, VK2SKY

The ACA has finally released the "Inconsistency Clause" in the Amateur Licence Condition Documents (LCDs), so that High Power Permits can now be issued for Amateur Earth-Moon-Earth (EME) transmissions. The effective date was January 19th, 2000 so amateurs interested in EME communications may apply for a High Power Permit immediately. This is yet another win for Australian radio amateurs and is a further example of the good work performed by the WIA on behalf of all Australian amateurs.

It is expected there will be more good news in the months ahead.

Alan Jordan of the ACA comments: - As a result of the gazettal (on 12 Jan) of the Radiocommunications Licence Conditions (Amateur Licence) Determination No.1 of 1997 Amendment 1999 (No.1) the following provision now applies Section 2 (2)

" However, if a condition in this Determination is inconsistent with a condition specified in the licence, the condition specified in the licence applies."

This would allow the ACA to apply a condition in an Amateur licence that would allow an Amateur to use a higher level of power than that provided for in the Determination. I understand that this would facilitate EME experimentation. As discussed, such authorisation will be on a justified case by case basis. The Determination also contains the changes necessary for the Olympics and some very minor corrections to emission modes.

ar

The Golden Antenna of Bad Bentheim

Prize winners honoured for their intensive personal and unselfish risks

In Germany there is a town which found its heart for amateur radio. It is Bad Bentheim, directly on the border with the Netherlands.

In 1999 amateur radio enthusiasts from all over Europe met at the German Netherlands Amateur Radio Days (DNAT) for the 31st time. Meanwhile thousands of amateur radio enthusiasts found their way to Bad Bentheim during the last weekend in August.

Since 1982 the presentation of the Golden Antenna of the town of Bad Bentheim has been on of the highlights of the celebrations at the DNAT. Amateur radio enthusiasts from the Netherlands Antilles, Brazil, India, Armenia, Rumania, Hungary, Italy and Belgium, The Netherlands, Switzerland and Germany have previously received this prize. With their amateur radio stations they had all helped people in an emergency caused by accidents or natural catastrophes. Their health or life was in danger or poverty was looming. All recipients of the prize were honoured for their intensive personal and unselfish risks. They established and maintained radio contact without which urgent humanitarian help would not have been possible.

If you, dear reader, know of any amateur radio enthusiast or group of enthusiasts whose utilisation of technology is connected to humanitarian work, please write to:

The town of Bad Bentheim,
P.O.Box 1452
46445 Bad Bentheim
F.R. of Germany

The Jury evaluating these nominations consists of experienced men and women, such as the President of IARU Region 1 and President and Chairman of the Dutch and German amateur radio societies.

The town of Bad Bentheim will again invite prize recipients to the 32nd German-Dutch Amateur Radio Days (DRAT) and take over the costs for travel and accommodation.

Do help us with your suggestions showing to the public the importance of amateur radio in an emergency.

Guenter Alsmeier
Mayor of the Town of Bad Bentheim
Bad Bentheim, December 1999

A Portable RF Resistance Measuring Set

Drew Diamond, VK3XU
45 Gatters Rd
Wonga Park, 3115

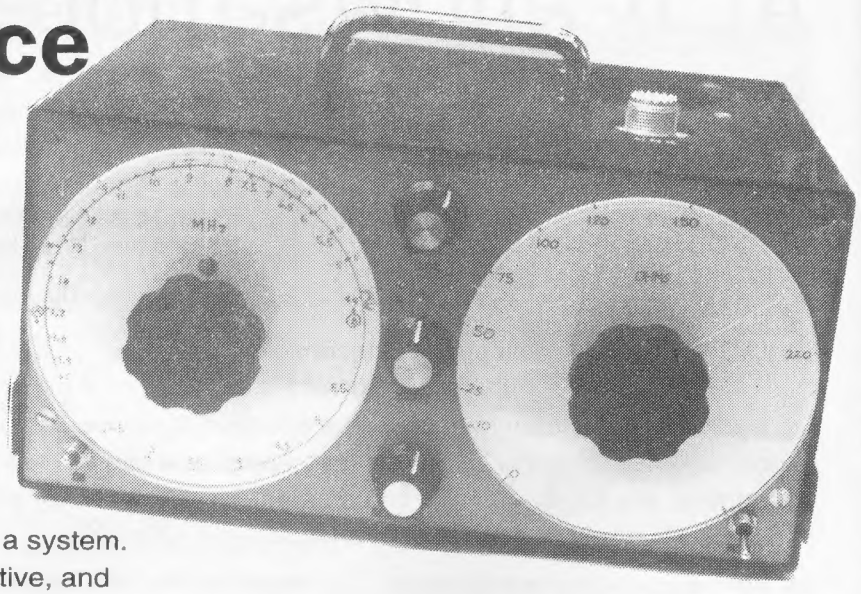


Photo 1: Resistance Measuring Set

For antenna work, an SWR meter, or bridge, may be used to measure the degree of mismatch at salient points in a system. But these devices are relatively insensitive, and may require anything from 1 W to 50 W to obtain a meaningful reading.

The noise bridge an amateur invention (Ref. 1) is better suited to protracted antenna and feedline experiments because impedance readings may be taken at various points in a system using very low power levels. Rather than the traditional laboratory method, which employs a modulated signal generator and straight detector; the noise bridge employs a broadband noise source as signal, and the station receiver serves as tuneable detector in a bridge measurement (Ref. 2).

In practice however, the noise bridge/ receiver set may be awkward in some applications, and lacks portability for outside work. So let's look at the "laboratory" method again: The human ear is a very sensitive instrument in radio tests. When making adjustments, it is much easier for us to listen for a null in an audio tone than it is for noise (Ref. 3). By using a tone-modulated RF signal from a generator, rather than noise, we eliminate the need for a sensitive receiver as detector. A simple diode and audio amplifier has sufficient sensitivity to easily detect a 1 mW signal, and allow adjustment for null in RF impedance measurements (Ref. 4).

Portability is greatly improved by combining the generator, modulator and R-bridge in one reasonably sized box. Something of the sort is now available from one or two of the test equipment makers- but they are rather expensive. It should not be too difficult for an experienced radio worker to make a similar instrument which is capable of reasonable accuracy but at much lower material cost.

In amateur tests, a bridge which measures only the R component may be usefully applied to most measurement problems. We can generally get around the lack of an X (reactance) arm because of our simple desire to have an antenna which presents a matched resistive load, and by reasonable assumption, works most effectively. And this condition is generally satisfied when the antenna is resonant and matched to the transmission line, whose impedance the radio is designed to work into. To us, the value of the X component is usually of academic interest only because, whatever the outcome, it must be eliminated, or reduced to as low a value as reasonably possible. A variation in the generator's frequency allows us to determine whether the antenna is too long, or too short .

To that end, the following portable

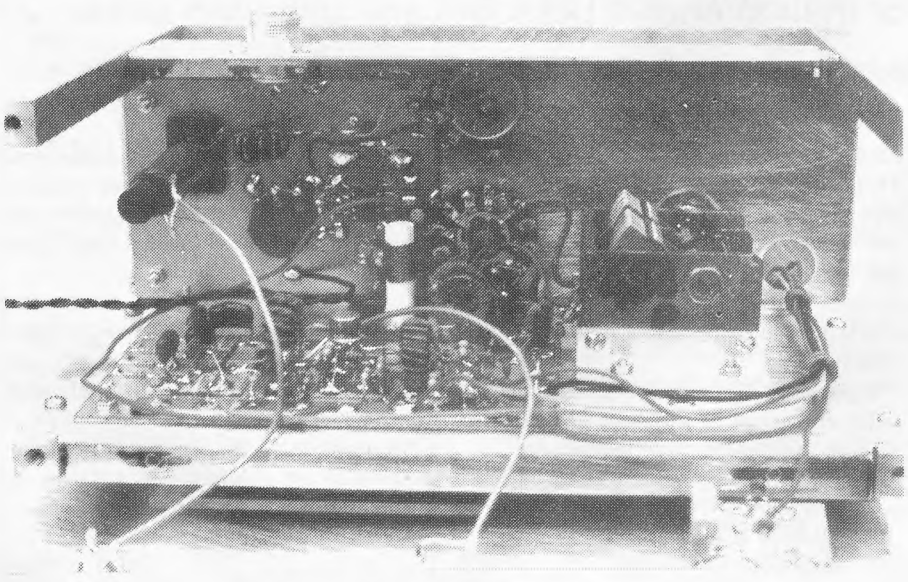


Photo 2:Internal view (rear panel removed for clarity)

measuring set is offered, which may be used to find, with reasonable accuracy;

- the resistance of an antenna feed-point, at resonance,
- velocity factor of RF cables,
- characteristic impedance of RF cables,
- the value of RF input resistance of amplifiers and other devices,
- settings for antenna couplers whilst putting only mW to air, and
- the value of microhenry inductors and pF capacitors.

Resistance range is 0 to 220 ohms. Internal generator frequency range is from about 1.7 to 31 MHz in three overlapping bands. The bridge may be used with an external generator for measurements between 100 kHz and 60 MHz. Naturally, the internal generator may be applied to other work where such a signal source is required.

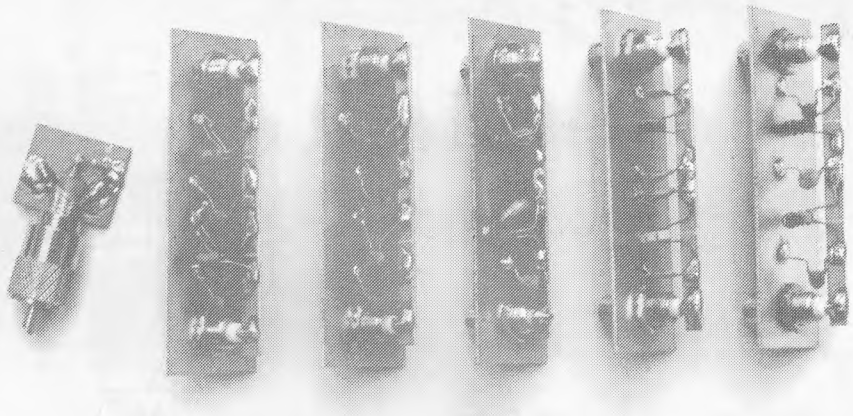


Photo 3: Low pas filters and resistance calibration fixture

Circuit

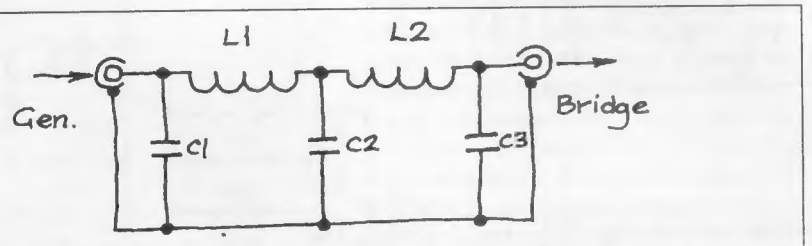
The measuring circuit is based upon the classic transformer-ratio-arm bridge, where the three identical windings of T4 are connected in trifilar form as shown in the schematic. Two windings are connected in series to create a tightly-coupled source with a neutral wire formed by the centre tap (ct). The signal voltage available at top and bottom windings are therefore identical in value, and opposite in phase. A diode detector is connected between neutral and chassis ground.

An AM tone-modulated RF signal of a few mW is applied, via balun T3, to the primary winding of T4. The balun is necessary to preserve capacitive balance between the ends of the secondary winding and ground. The bridge will be "in balance" when the value of the non-inductive variable dial resistor is adjusted to exactly equal the resistance applied to the "unknown" connector. Under balanced state, there will be no signal for detection at the neutral point. However, when either the Unk. or dial resistance's differ, balance is disturbed, and a signal is created whose amplitude is proportional to the degree of imbalance. The detected audio tone, via a 10k sensitivity pot., is presented to a conventional LM386 audio amplifier and miniature speaker.

Operationally, if the impedance connected at Unk. is in the 0 to 220 ohm range, and predominantly resistive, an audible "null" is produced when the dial resistance is adjusted to match that at Unk. Should there be some reactance present, the null will be less pronounced. The generator may be varied in frequency together with the R- dial to obtain a deeper null. More under "Operation" below.

A Colpitts oscillator maintained by an MPF102 FET supplies the test signal from 1.7 to 31 MHz in three bands. Generator signal at the drain is loosely coupled to gate 1 of the BFR84 dual-gate FET buffer amplifier. Generator amplitude is adjusted by varying the voltage applied to gate 2. A 2 V peak-to-peak 1 kHz sine-wave signal from a simple phase-shift modulation oscillator may also be applied to G2 to obtain amplitude modulation of the generator signal. A 2N3053 broadband amplifier raises the signal to a suitable level between about 1 and 10 mW. The 3 dB attenuator is included to establish the generator's output impedance at close to 50 ohms.

The generator output is reasonably sinusoidal, but harmonics are still of sufficient amplitude to spoil the null when measuring frequency sensitive devices (such as an antenna feed-point). The depth of the null is greatly improved by passing the generator signal through an appropriate 5-element low-pass filter before it is applied to the bridge. A set of plug-in filters with roll-offs of 2, 4, 8, 16 and 32 MHz covers the HF spectrum.

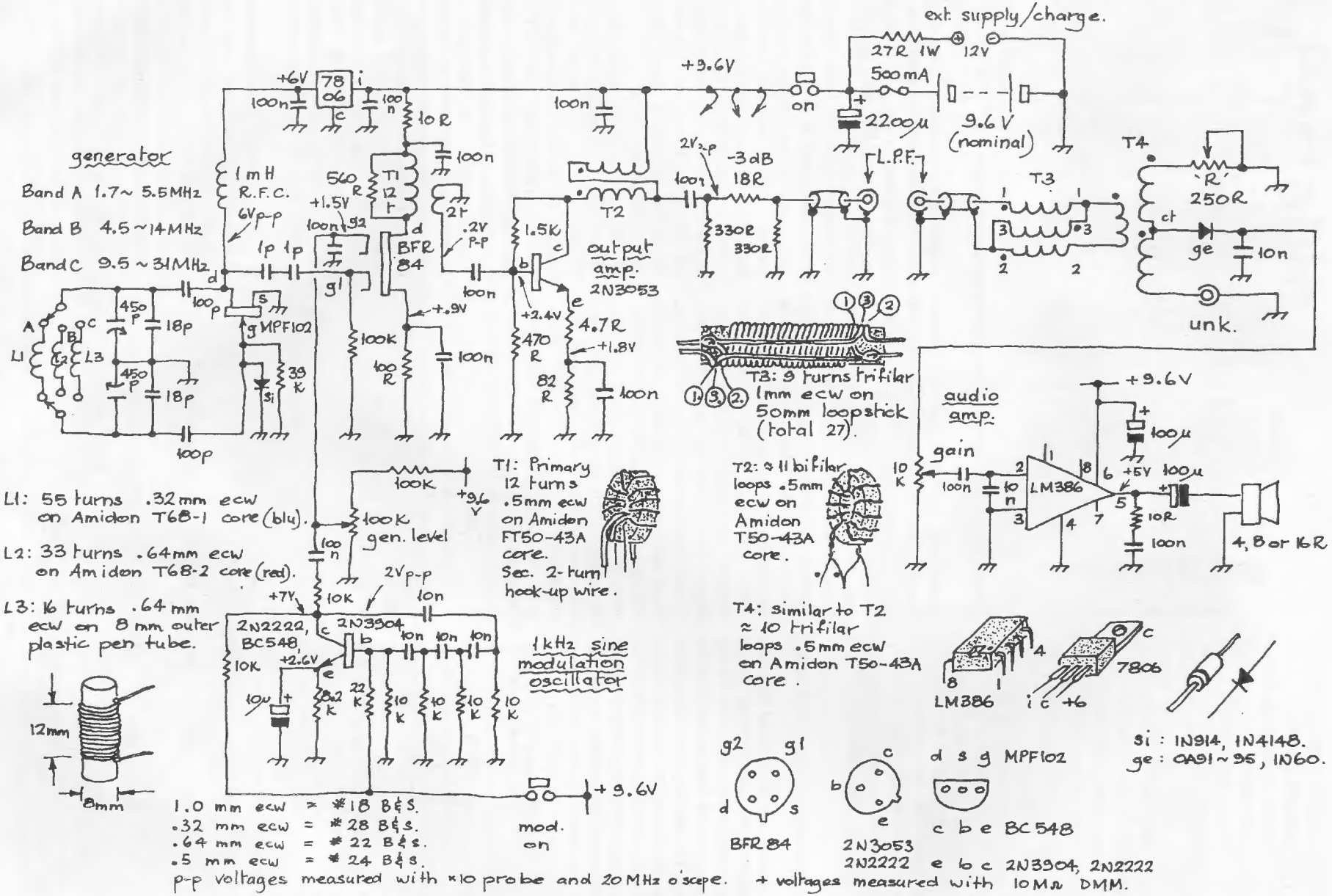


Roll-off MHz	C1, C3	C2	L1, L2 ~ comprising:	
2	2n	4n	4.7µH	stock R.F.C.
4	1n	2n	2.2µH	" "
8	220+220p	820p	1µH	" "
16	220p	220+220p	0.5µH	10t .5 mm ecw on Amidon T37-6.
32	100p	220p	0.3µH	7t .5 mm ecw on Amidon T37-6.

Low-pass Filter Set.

Table 1

continued next page


ext. supply/charge.
27R 1W
12V
500mA
9.6V (nominal)
2200µ
+9.6V
on
+6V
78 06
100n
10R
generator
Band A 1.7~5.5MHz
Band B 4.5~14MHz
Band C 9.5~31MHz
1mH R.F.C.
6Vp-p
560R
T1 12t
2t
+1.5V
BFR 84
1p 1p
100p
450p
18p
39K
MPF102
100K
100R
+.9V
.2V p-p
1.5K
output amp. 2N3053
+2.4V
470R
4.7R
+1.8V
82R
2Vp-p
-3dB
18R
330R
330R
L.P.F.
T2
T3
T4
'R' 250R
ge
unk.
T3: 9 turns trifilar 1mm ecw on 50mm loopstick (total 27).
audio amp.
gain
10K
LM386
100µ
+5V
4, 8 or 16R
T1: Primary 12 turns .5mm ecw on Amidon FT50-43A core. Sec. 2-turn hook-up wire.
T2: 8 11 bifilar loops .5mm ecw on Amidon T50-43A core.
T4: similar to T2 ≈ 10 trifilar loops .5mm ecw on Amidon T50-43A core.
L1: 55 turns .32mm ecw on Amidon T68-1 core (blu).
L2: 33 turns .64mm ecw on Amidon T68-2 core (red).
L3: 16 turns .64mm ecw on 8mm outer plastic pen tube.
12mm
8mm
100K gen. level
+9.6V
2N2222, BC548
2N3904
10K
+2.6V
8k2
22K
10K
1kHz sine modulation oscillator
+9.6V
mod. on
LM386
7806
i c +6
si : IN914, IN4148.
ge : OA91~95, IN60.
g2 g1
d s
BFR 84
c
b
e
2N3053
2N2222
d s g MPF102
c b e BC548
e b c 2N3904, 2N2222
1.0 mm ecw = #18 B&S.
.32 mm ecw = #28 B&S.
.64 mm ecw = #22 B&S.
.5 mm ecw = #24 B&S.
p-p voltages measured with ×10 probe and 20MHz o'scope. + voltages measured with 10MΩ DMM.

continued from previous page

Construction

The prototype is housed in a home made aluminium box measuring 220 x 150 x 110 mm WDH. Naturally, any metal box of similar dimensions will do. The generator components are accommodated "paddyboard" style (Ref. 7) upon a plain circuit board measuring 100 x 120 mm. The bridge and audio amp. are mounted on a second board measuring 90 x 70 mm. Use reasonably short connections, especially the generator and bridge components. The LM386 may be fitted into a wire-wrap socket, which in turn is mounted "paddyboard" fashion upon the board. The circuit boards may be fixed with 3 mm screws upon a "sub-chassis" as shown in Photo 2.

Balun T3 is very similar to that described previously in Ref. 6. Wind 9 turns (total 27) of 1 mm ecw trifilar onto a 50 mm length of ordinary loopstick rod. Winding starts are the dotted numbers (1. 2. 3.). Note that the start of winding 3 is connected to the end of winding 1, and the end of winding 3 is connected to start winding 2. The balun should then the encased in epoxy cement. Upon assembly, the balun should be cemented into a drilled phenolic or perspex base, which in turn is cemented to the bridge board, as shown in Photo 2.

Bridge transformer T4 has 10 loops of 24 B&S EC wire trifilar wound upon an Amidon FT50-43A core. Make sure the wires are not scratched during winding. Remove about 20 mm enamel form each wire. Using your multimeter on ohms, identify the individual windings. Now connect the start of one winding to the end of another to form the centre tap. The remaining "free" winding is the left-hand primary side shown in the circuit.

To obtain good frequency and resistance resolution, the dials must be as large as can reasonably be managed. Mine are white undercoat spray-painted aluminium discs measuring 100 mm diameter, thus taking the full height of the box. The 250 ohm carbon pot is mounted upon the sub-chassis, with a flexible coupler attached. The perspex cursor is affixed to the back of a suitable knob as shown in Photos 1 and 5. The cursor for the frequency dial is attached to a 6:1 planetary drive, which in turn is flexible-coupled to the variable capacitor spindle. The dial disc components may be produced in the chuck of an ordinary electric drill. Compass, then cut out your aluminium and perspex discs using a rod-saw or similar. Drill a 1/4" hole dead centre of each. Take a 1/4" Wh. bolt, about 2" length, and cut off the head. Fix the disc in this "chucking piece" using a pair of nuts and washers. Mount the drill in your bench vice. Carefully apply a flat file to the outer edge of the rotating disc to obtain a smooth round finish.

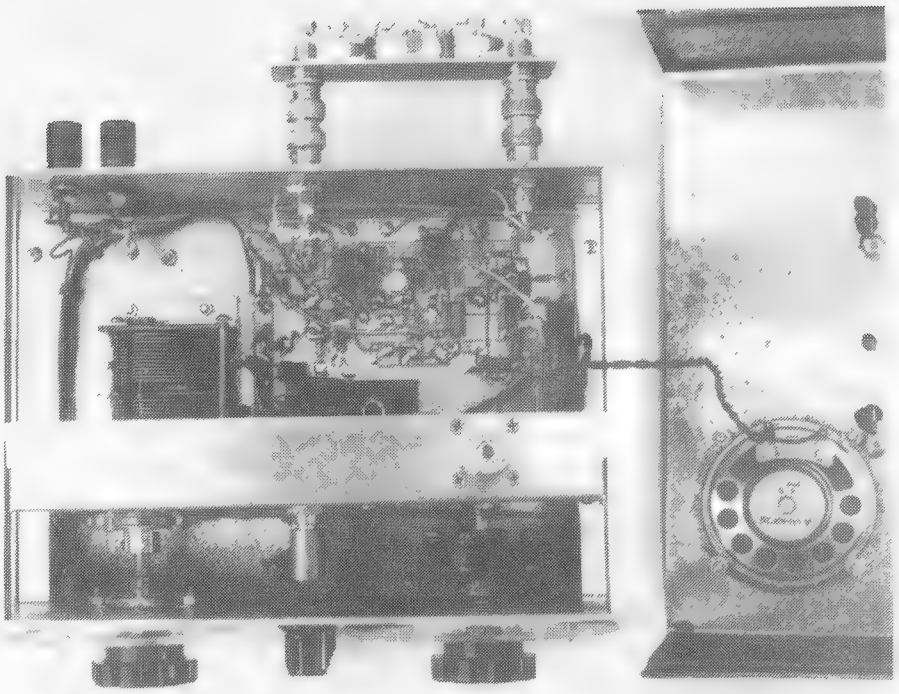


Photo 4: Plan view, top cover set aside

The dual-gang variable capacitor for the generator is not a stock part. However, they are by no means rare items, and can be found at swap-meets, traded with radio friends etc. Measurements upon a number of caps removed from junked Australian BC radios showed that values of between 450 and 480 pF per gang is typical (until I actually measured a number of these, I had assumed that 415 pF was more common). So any well-made dual-gang of 450 or 500 pF will do.

Coils for the generator should be epoxy-cemented upon insulated material, such as phenolic. The frequency range switch is mounted just above the coils to permit wiring with short leads. Range coil A (1.7 to 5.5 MHz) is wound on a T68-1 core, and range B (4.5 to 14 MHz) on a T68-2 core. Only a small inductance is required for range C (10 to 31 MHz), which is wound upon an 8 mm plastic pen barrel. For best stability, build the generator according to VFO rules. Turns details are shown on the circuit.

A suggested construction method for the low-pass filter set is shown in Photos 3 and 4. 100 x 30 mm rectangles of single-sided circuit board are each fitted with BNC sockets spaced about 75 mm (to match sockets mounted upon the rear panel of the box). An 80 x 7 mm strip of board is divided into three equal "lands" with a junior hacksaw by grooving the copper foil in two places. Filter circuit values are shown in table 1. The 2, 4 and 8 MHz filters use stock choke coils as shown. The 16 and 32 MHz filters use coils wound on T37-6 cores. Solder capacitors between lands and ground foil, and coils across the grooves.

Current demand is about 40 mA. The set will work satisfactorily from a battery supply of between about 8 and 12 V. I plan to get a lot of use out of my own model, so have incorporated a 9.6 V radio-control model Ni-Cd battery (D.S. S-3313) sandwiched between perspex sheets, into the space below the sub-chassis as shown in photo 5. Or your battery may be fixed to a holder external to the box, depending on operational preference.

Calibration

Before applying power, go over your wiring and component polarities again and confirm that all is correct. Leave the gen./bridge RF input link (which is made via an LPF or short coax) open for the moment. Switch on. Full clockwise rotation of the

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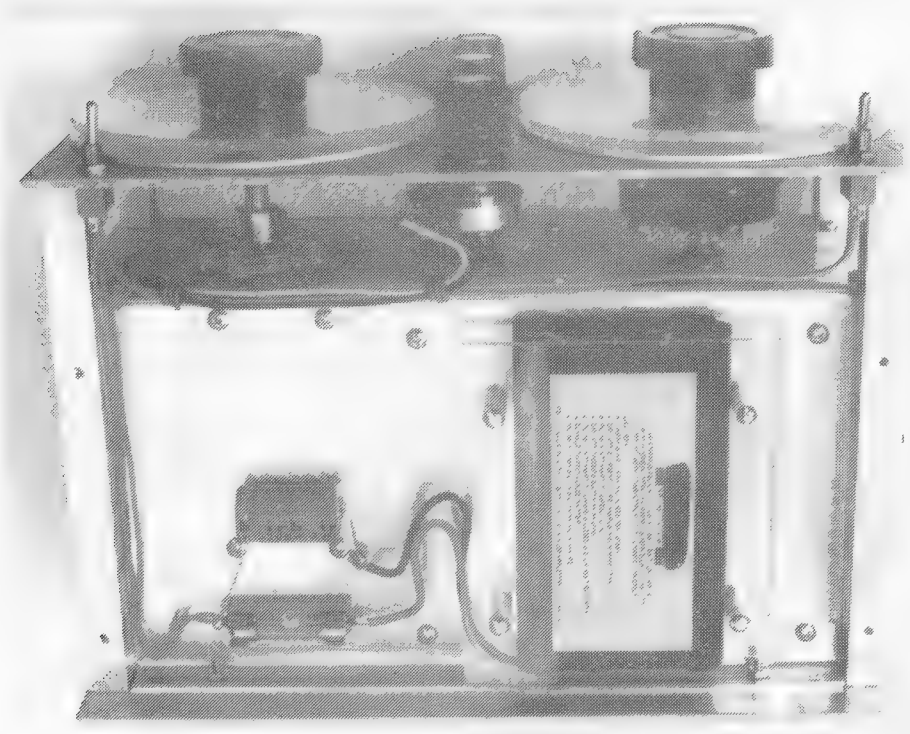

Photo 5: Underside battery compartment

continued from previous page

gain pot should produce a just a soft hiss from the speaker.

If an oscilloscope is available (of at least 30 MHz BW), connect a coax cable between the generator output and 50 ohm thru-terminated o'scope input. Confirm that at least 1.5 V peak to peak (p-p) is output when the generator is tuned through each range. Check that the level control affects a smooth variation in output from about 0.5 V to 1.5 V p-p. Set the level for about mid range, then switch the mod. osc. on. You should observe a 1 kHz modulated RF waveform of about 50 %. Best looking shape and depth should occur at about mid-travel of the level pot.

No o'scope? Connect an RF probe and 10 megohm DMM to the gen. output, which is terminated in 50 ohms. Output should be at least 0.7 V. Listen to the gen. signal on your station receiver in AM mode. Switch on the mod. osc. You should hear a stable pure tone, about 1 kHz. Check frequency range(s) with the means available to you, be it electronic counter, or general coverage receiver, and if satisfactory, calibrate the gen. dial. Pencil salient points around the perimeter first, then remove the knob/cursor and apply calibrations to a circle compassed upon the dial disc using a fine black pencil or rub-on letters. Apply a coat of clear lacquer.

With the gen. working and calibrated, link the output to the RF input connector of the bridge using (say) the 16 MHz LPF. Obtain a set of 1/4 W, 1 or 2% resistors of 10R, 100R (4-off, to make 50, 100 and 25 ohms), 120R, 150R (2-off, to make 150 and 75 ohms), and 220R. Suggested calibration points are 10, 25, 50, 75, 100, 120, 150 and 220 ohms. Starting with the most popular impedance; 50 ohms, take two 100R resistors and solder them to a PL-259 (or whatever you prefer) plug, to which is attached a small square of circuit board, as shown with the filter set in Photo 4. Set the gen. to mid HF, say 14 MHz at about 2 mW (mid-point of the level pot). Switch the internal AM on. You will hear a tone. Carefully adjust the resistance dial for a null, which should be deep and quite sharp. With a pencil, mark this 50 ohm cal. point. Do the same for all other desired cal. points between 0 and 220 ohms. The null at the high resistance end may not be as sharp as those obtained at the low end.

Operation

The bridge finds primary application in antenna work. If physically possible, the feed-point of the antenna is connected to directly to Unk. Sweep the R dial around the nominal impedance whilst listening for a null. Also adjust the generator frequency for deepest null, then read off the resistance and resonant frequency. Let's suppose we want a ground plane with four sloping radials be resonant at 14.1 MHz and present 50 ohms, but we read 40 ohms and 14.0 MHz. It's too long. Shorten each element a bit and measure frequency again. We could raise the impedance a little by increasing the angle of radial slope, and measure again. Check for inter-action between variables.

It's easy with a ground plane, because we can generally get at the feed point. What do we do with a more remote feed point? "Use an electrical half-wave (or multiple thereof) of low-loss coax feed-line" blithely say's the radio handbooks. To do that we need to know the velocity factor (v) of the cable so that we can be sure of the electrical length. If the velocity factor is known then;

Electrical 1/2 wavelength in metres = v multiplied by (150 divided by f MHz).

For example, the coax maker gives v as 0.66, and we want 1/2 wave at 14.1 MHz,

then; length = 0.66 X (150 divided by 14.1), which gives 7.02 m.

Before we go cutting up lengths of precious cable, we can measure the (v) of a sample. Connect one end of a sample length (say 6 m) of cable to Unk. Short circuit the far end (perhaps with an alligator clip). Set the R dial near zero (because zero ohms will be reflected over exactly 1/2 wavelength). Sweep the generator down from 30 MHz looking for the lowest frequency which produces a good null. Note the frequency. Calculate;

Velocity factor = (length m multiplied by f MHz) divided by 150.

For example; a 6 m sample length of coax has lowest null at exactly 16.5 MHz, then;

v = (6 X 16.5) divided by 150, which gives 0.66.

Let's say at a hamfest you buy, at bargain price, a mystery coil of coax cable. The person who sold it to you "thinks" it is 50 ohm, but no one is sure. How to measure the characteristic impedance (Zo)? If it is very long, cut off a 3 or 4 metre sample length. Connect one end to Unk using a suitable plug. Solder a miniature 220 ohm carbon trimpot, between one side and slider, to the far end. Set the gen. initially to about 30 MHz and R-dial to the supposed impedance of the coax. Repeatedly adjust gen. frequency, R-dial and trimpot until the null is held constant, regardless of frequency. The value of the trimpot's resistance will then equal the Zo of your cable, which is also shown by the R-dial. The same method may be used to find the Zo of any reasonable length of cable, both coax and twin pair.

To find the value of an unknown microhenry coil; connect the coil IN SERIES with a (say) 100 pF mica capacitor across the Unk connector. Set the R dial to about 10 ohms. Vary the generator frequency and R dial until best null is obtained. Note the frequency. The value of the coil, in microhenries (uH) may be calculated:

LuH = 25330 divided by (f MHz squared X 100 pF).

Similarly, when frequency and inductance are known;

CpF = 25330 divided by (fMHz squared X LuH).

To adjust an ASTU (or antenna coupler); replace the usual radio coax connection with Unk of the bridge. Set the R dial to your coax impedance (typically 50 ohms). Set the gen. to the required frequency. Now carefully adjust the ASTU, listening for a deep null in tone, then note the settings for each band of interest.

When working with large antennas, you may hear broadcast stations mixed with the tone (the detector acting as an un-tuned crystal set). Simply ignore the babble and concentrate on the tone, which may be nulled in the normal way.

Parts

The 250R carbon pot (carbonized plastic track- or "Cermet"), Spectrol P/N 350-497, is known to be available from Farnell (02 9645 8888). A similar type is also available from Rockby Electronics (03 9562 8559), where the Cat. number is RB51X250R. Cost is about $6. See Hamads for Amidon core retailers. The BFR84 is a Dick Smith (D.S.) part. D. S., Jaycar and Electronics World have loopsick rod material for the balun (shorten by grinding a groove around the circumference then snap, as you would break a stick). Quite good flexible couplers may be made from 30 mm lengths of 6.5 mm i.d. rubber fuel hose held captive with hose clips. The remaining parts are available from the usual electronics suppliers.

References and Further Reading:

1. "The Antenna Noise Bridge", Hart, W5QJR, QST, Dec. '67.
2. "A Review of Antenna Noise Bridges", Slutzkin, VK3SK, AR, Mar, Apr. May '81.
3. "A Few Tips On the Design of the Noise Bridge"; Butler, VK5BR, AR Feb. '90.
4. "An RF Resistance Bridge"; Diamond, AR, July '99.
5. "Another Tip For Using the Noise Bridge"; Butler, VK5BR, AR Dec. '94.
6. "A Home-brew HF Balun", Diamond, AR, Oct '97.
7. "Paddyboard Circuit Construction", Diamond, AR, Feb. '95.

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EDUCATION

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What does an incoming amateur need to know?

At this time of the year I am thinking about the annual report of the Education Co-ordinator to the Federal Council. As our financial year runs from 1st January to 31st December, I must report on my activities and achievements during that period.

It has been a very quiet year, most of it having been spent waiting for action from the ACA. We have achieved another set of approved Regulations examination papers, but the ACA seems to have had little time to consider the future of the Amateur Service. We were promised a discussion paper about the further devolvement of examinations, but this has now been delayed until early this year. Consequently, our plans for revision of the examination syllabuses have had to be postponed also.

I have written previously about the need to review the syllabuses. The current syllabuses have lost their relevance as the "state of the art" has progressed. The last major review occurred in about 1984, before the development and widespread usage of so many "chips". At that time there were still amateurs building and designing equipment from discrete components using resonance nomograms and similar tables to determine the values of components to use. The knowledge that was appropriate at that stage is no longer relevant when a transmitter can be built from a handful of integrated circuits, and the internal functioning of the IC is masked.

So what does an incoming amateur need to know? Some of the basic principles still apply.

Antenna design and function are still with us, as is propagation at all permitted frequencies. It is vitally important to be aware of the possibilities of interference and the steps to be taken to avoid or control it.

Safe operation of both the home station and in the portable/mobile situation must be considered. Some awareness of the use of basic test instruments should be included so that simple troubleshooting can be carried out. Transmitter and receiver design could probably be reduced to block diagram level, with a knowledge of the inputs and outputs of each stage.

Please be aware that these ideas are largely my own, not those of the Federal WIA or the Education Committee. They have been discussed only very superficially with the ACA. But when the time comes for reviewing the syllabuses I intend to advance them. I will be happy to receive comments from readers on any aspect of syllabus review.

On a slightly different topic, it was pleasing to see the increased demands on WIA Exam Service at the end of the year. It suggests that there are many classes out there operating to advantage. May I wish all this year's classes a successful and profitable 2000.

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VK9RS
"Rowley Shoals"

IMPERIEUSE REEF
OC.230

IOTA DXpedition

By Stephen Pall. VK2PS.

The charter boat was slowly approaching Imperieuse Reef. The 900 H.P. twin-screw engines of "Kingfisher III", the 17 metre long game fishing boat, throttled down from normal cruising speed of 22 knots to 10 knots.

All of the team were on deck, looking apprehensively at a slim, white sand line, barely visible in front of us - at a distance of about 3 kilometres. The white sand line was Cunningham Island a longitudinal sand cay. (170 31' 31" South, 118o 56' 46" East). The island appears much smaller compared to some old photos that were seen previously. There are no trees, shrubs or grass, just gleaming white coral sand. Only a man-made stainless steel lighthouse breaks the line of sand similar to a freestanding rocket, about 40 metres in height that glittered in the sun. The lighthouse is situated on the northwestern side of this small island, about 200 metres away from our landing point, standing in the sea on the edge of a narrow rocky lagoon.

IT WAS EARLY MORNING local time on the 21st of September 1999. The charter boat has dropped anchor just outside the reef and the loading of almost 2.5 tonnes of equipment into two 4.5m aluminium dinghies has begun. It took the two dinghies seven trips across the vivid green waters of the shallow coral reef lagoon, to land the equipment on the island. Fortunately the waters of the lagoon were very calm and crystal clear, so no mishaps occurred. It is now 2340 UTC (0740 am), we are on a narrow beach with mountains of bags, cables, waterproof boxes, generators, tent poles, tents packed in bags, disassembled aluminium tubes belonging to a variety of antennas, drums of fuel and barrels of drinking water.

The aluminium dinghies have departed - the charter boat is now only a small dot on the -horizon and we are alone, no other sound except our own. The weather was fine, blue skies, no clouds and, surrounded by the green-azure waters of the lagoon. A merciless blinding sun shone on us. The air was heavy with moisture.

Four radio amateurs facing the unknown on a tiny speck of sand, filled with the zeal of missionaries to activate amateur radio for the first time on a little island which is off limits unless one has a special landing permit.

The Rowley Shoals are located in the Indian Ocean in the tropical far north of Western Australia. They are large emergent shelf atolls rising from depths of between 440 and 230 metres along the edge of the continental shelf. They lie between 300 to 379 kilometres due west of Broome, a tropical town, home of the largest salt-water crocodiles and center of a large cultured pearling industry. Broome has a moving population of 12,000 and it is very busy this time of the year. Big offshore game fishing and casual holidaymaking is in progress and accommodations are booked out 12 months in advance. The Shoals are ranked as one of the most remote and pristine marine areas in the world, and are part of a great Marine Park established in 1990. It is managed by the West Australian Department of Conservation and Land Management, (CALM). At low tide the water forms ponds within reef walls, gushing over them like waterfalls and our little island is only 1.5 metres above the high-water mark.

The Rowley Shoals consist of three atolls. We are on the most southern, "Imperieuse Reef', that is approximately 18 kilometres long and 10 kilometres wide. The only semi-permanent land in the atoll is Cunningham Island at the northern end of the reef.

Captain Rowley named Imperieuse Reef after his sailing ship in 1800. The island itself changes shape and size often due to the seasonal cyclones, which can be very severe sometimes.

The lighthouse, which now stands in water, was originally built in the centre of the moving island.

After a 20 hour sea voyage from Broome, luckily for us on a very smooth sea, we gradually haul our DX cargo from the beach, bit by bit, to the middle of the little sand island. Our immediate aim and is to establish our shaded area and this was a large tent-like, square structure that could be raise and lowered, made of green 90% shade cloth.

The tent was over two metres in height and 7.5 metres square with open sides. This was our home!! The"Rowley's Cafe". Originally there had been plans for two tents, one for the SSB station, one for the CW station, and individual small tents for each of us. Due to the intense heat these plans were changed. Only one tent was erected for the SSB stations and the CW station was squeezed onto a small table in "Rowley's Cafe", which became a combined sleeping, recreational and storage area. In one corner a field gas burner represented the kitchen and meals area.

We had a short flag raising ceremony at 0430 UTC, or just after noon local time the flags of Australia, Portugal and the United States of America fluttered in the breeze, whispering to our silent friends. We continued with the installation of the 20 metre 4 square antenna. With a temperature of 40o plus Celsius in the open, only 20 minutes of work in the sun was followed by a short pause in the tent, where the 32° C in the shade was a welcome relief. The level in our individual 20 litre drinking water barrels started to recede, we were sweating and feeling dehydrated. In addition one of the team was still suffering the effects of a food poisoning bug which he picked up a few days before our departure. All three generators were now working and the chemical portable toilet was in place. The afternoon was spent on laying power and transmitting cables and the shape of the vertical Butternut antenna started to emerge

continued next page

"Rowley's Cafe" and SSB Tent

A thumbnail sketch of the participants.

SAM, CT1EEN

was the youngest in the group, in his early 30's. Sam is a builder who graduated from CB radio. He has had his amateur licence for nine years and after chasing DX soon became an "island hopper" from a variety of Portuguese and Spanish islands, and also Cape Verde D44. Sam flew into Perth via Frankfurt and Singapore, and traveled with Mal from Perth to Broome, a distance of 2232 kilometres. During the road-trip they changed vehicles at Karratha, upgrading from a sedan car and one tonne trailer to a 4 wheel drive and two tonne trailer. Four heavy duty tyres were ruined on the trip from Perth due to road conditions. When I asked Sam what was his most memorable event on the trip to Broome he listed kangaroos kissing the front of the vehicle, the closed roadhouse which meant slowing down to conserve fuel and the innumerable occasions when tonnes of equipment were loaded and unloaded from trailer, storage places, up steps and down steps. According to my calculations the equipment was moved 23 times on the return journey from Perth - Broome - Perth.

JIM, K9PPY

our SSB/CW operator is a professional mechanical engineer and comes from the small town of Itasca, near Chicago, Illinois, USA. He is in his early 50's and a keen supporter of IOTA. He has operated from many American and Canadian islands, and also from Sirat-Al-Kaywar an IOTA island in the Gulf of Oman as A61AH. He was 16 years old when he started listening on short wave on a simple set bought by his father. For a number of years he was chasing DX, and then in 1989 was introduced to IOTA by a radio amateur friend of his. He now has approximately 870 islands confirmed. Jim arrived in Broome via Los Angeles, Sydney and Darwin. He was disappointed when he was unable to have a short stopover in Darwin due to sudden changes in plane schedules.

MAL, VK6LC

is a professional electrical design engineer, also in his early 50's. He is the "total" DXpeditioner. He has had his amateur licence for 16 years and started activating many Australian and overseas islands about 11 years ago. Malcolm has an excellent record as an IOTA DXpeditioner and has activated 22 Islands establishing 11 brand new references. His self-designed 20 and 40 metre vertical 4 square antennas have never let him down. Much of the auxiliary equipment on this expedition was designed or manufactured by Mal, including the 56 square metre "Rowley's Cafe" tent. He was the organizer, designer, antenna assembler, chief mover of equipment, security, Medic, generator attendant and manager for the group. He even made some time between sleep periods to operate on SSB as a duty operator. Mal's words after the operation: No accidents, No equipment failures, I've done my job!! We are all back in one piece??? Time for a cold Beer!!

STEVE,VK2PS

in his late 70's, flew in from Sydney via Perth. He is a retired insurance broker and a keen DX-er. For almost 10 years he was the DX.Editor of the national magazine of the Wireless Institute of Australia, "Amateur Radio". Steve's amateur activity started in 1938 in Europe when he was a 16 year old high-school student. He re-activated his amateur life in 1979 and was always a keen supporter of Mal's island activities. This expedition was his life's dream come true and was a good introduction for future IOTA activities. Steve likes to operate in CW mode, and according to Mal this was one of the few IOTA expeditions where operating CW made a good contribution to the overall number of QSOs.

As we all know, DXpeditions to the remote parts of the globe cost money and despite the mandatory personal contributions by the operating participants, outside help in sponsorship and donations is needed.

This was the most expensive DXpedition for Mal, as previous ones were financed mostly from Mal's private resources. Despite careful costing the final budget of the. DXpedition came out at US$l5000 (about A$24000), due to a lot of unexpected expenses. Mal's friendly bank manager is not in a good mood.

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from the evening dusk. The length of the dusk in the tropics is very short and at 1810 local time it was pitch dark. The great moment finally arrived after 12 hours and Rowley Shoals, VK9RS was on the air. The first contact was made with KD1CT on the 20 metre band at 1139 UTC. Floodlights, brought with us, came into action to complete the remaining setup and at midnight local time - after the hard work we were all ready.

Originally the team consisted of 5 expeditioners. Sam, CT1EEN from Massama Portugal, Jim K9PPY from Itasca Illinois, USA, Dave VK6DLB from Karratha, Western Australia, Steve VK2PS from Sydney and the organizer and leader of the expedition, Malcolm VK6LC from Perth. Michael, VK6BHY from Karratha provided the 80 metre support link with the mainland. When we left Broome there were only four of us as Dave VK6DLB had dropped out due to ill health. The reduction in manpower meant that the physical work involved in setting up increased for the rest of the expeditioners, delaying the early on-air schedule.

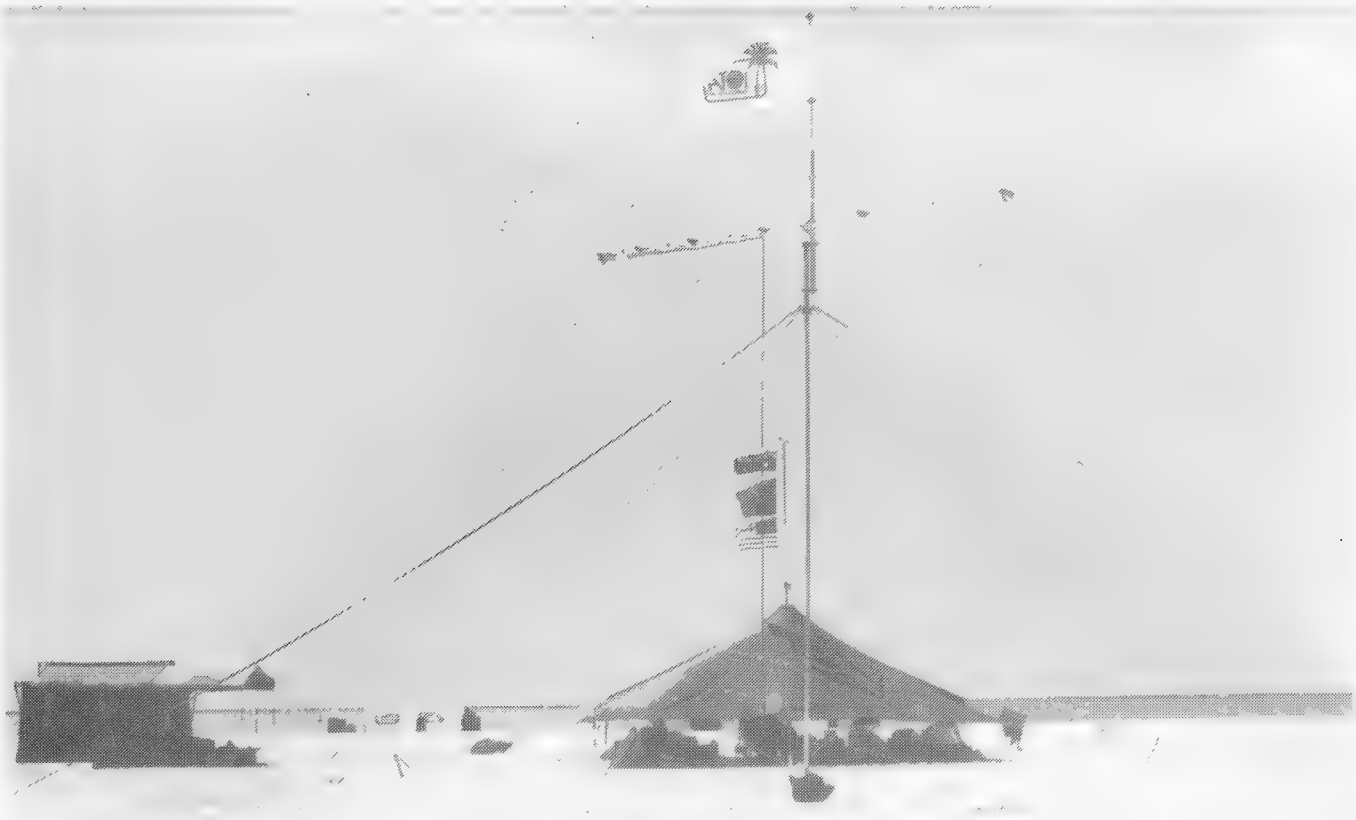
Contacts

At the end of our activity the expedition had approximately 10800 contacts in the logs with seven continents, 132 DX entities and 165 islands. All this was achieved in four 24 hour days i.e. 96 on-air-hours on the following bands: 80 - 40 - 20 - 17 - 15 - 12 and 10 metre bands.

Most of the operation was in SSB mode but over 1000 contacts were made on CW.

There was only a minimal activity on 40 metres because we were all worn out and down one operator. Jim and Sam made most of the contacts and Mal contributed to the numbers when his other duties allowed. Our 100 watt CW operation started on the 22nd September with intermittent activity depending on availability of antennas. We had a 4 square vertical system for 20m, an Australian six element log periodic for the higher bands, a multiband Butternut antenna and three transceivers. These were all backed up by a 100% redundancy AC/DC power system.

The 4th station was set up with 2 commercial radios used for medical emergency (VZBOI) and ship to shore liaison with the charter vessel.



"Rowley's Cafe" and SSB Tent: another view

A Typical Day

Here is a typical 24 hour day from our lives on the island:

I wake up, and stare at the shade cloth above me. There is an absolute silence; the SSB tent is quiet. It is 05.30 am. It is dawn but the sun is not up yet. There is a medium breeze from the southwest. The breeze is our natural airconditioner and the usual daytime temperature of our tent is 30-32°C. It is now a very pleasant 23° C. I can hear the fluttering of the national flags above me, on the main mast of the tent. As I turn around, I notice that there is a light dew on everything. The air was full of moisture during the night with the result that everything is now moist. It is now 06.10 am and the sun is up, moving rapidly on the eastern sky. The bluish haze on the horizon dissolves and the water in the lagoon turns a vivid green-azure blue with reflections of bright yellow from the sun, the tide is coming in. Sam and Jim are asleep wrapped up in their sleeping bags as protection against flying sand and bright daylight. They are very tired, and went to bed about 3 hours ago, (1900 UTC) when propagation ceased towards Europe and North America. Malcolm and I are sharing a king-size air mattress, as mine attracted a loose fishing hook during the sea voyage, and the temporary repair did not work. I switch the electric kettle on; power is supplied by our small reserve generator, and look into the portable refrigerator and our storage bins for something to eat. Meals are taken when there is no propagation. All our bread became mouldy and useless from the high humidity by Wednesday morning, so there was no need for breakfast cooking, Some canned fruit, breakfast cereal and specially prepared milk and coffee was quite an adequate breakfast.

The cool breeze has stopped, there is now a warm breeze from the east and the temperature is rising in Rowley's Cafe. At 09.00 am it is now 30° C. I walk 50 paces down to the lagoon for my morning swim. The water is very salty and warm. One would want to spend hours in this water but it is not possible. The heat affects us and the reflected light on the coral sand of the beach is blinding. We have to be constantly alert for stings from floating sea wasps (a type of box jellyfish) and possible mishaps from deadly sea snakes. We try to avoid stepping on spiky rockfish and wear special reef shoes to avoid cuts or scratches, which could result in coral poisoning.

Mal gets up, does his regular intruder watch, refuels the generators and checks all the equipment and antennas that have been operating continuously without any failures.

It is getting towards midday, the bands are dead. Jim and Sam are now up and we all compare notes from last nights activity. We discuss bands, the number of islands worked, the number of contacts, and daily reports from our pilot stations. Jim is looking after the Americas. Sam is trying to cover Europe and "keep some volatile southern Europeans" in order.

With my limited CW operation, I use the "first come first served method". Here I am, fighting my way through endless barrages of stations, dog-piles that never seem to end. In the background I hear a loud vibration from Mal; "The pilots have requested more CW"!!

Today was a happy day. Unexpected visitors? The charter fishing boat "Kingfisher III" reappeared on the horizon and tells us, on our special commercial marine transceiver, that they had a very successful side trip of deep sea game fishing. They will send over a large coral trout and a bag of ice to be melted down for cold drinking water. This was the first and last time we did any serious cooking. The fish tasted wonderful - maybe we were hungry too. Mal checks the bands and calls

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out"10 metres is wide open", Jim and Sam disappear into the SSB tent and soon one hears the familiar monotone noises: "four Delta Lima you are five and nine". The long periods of activity are on again and the water and black coffee supply to the SSB tent gets under way. Steve is in Rowley's Cafe" and on the Bencher key. The Yaesu FT900AT is on a small picnic table and is connected to the auxiliary generator. There is propagation to Japan and North America on 15 metres and the log pages rapidly fill up. It is now late afternoon and the breeze is from the South. The temperature in the shade is 26° C. There are dark contours on the horizon where the sky meets the sea. Shortly after 6.00 p.m. we witness a majestic sunset as the sun goes down and within 10 minutes there is total darkness. Everybody is now on the air. Malcolm is using my station, so I catch up with my notes. Tomorrow is the last day of our activity.

Saturday, 25th of September. The good weather is still holding but the breeze is getting stronger, and I see a few small tuffs of cloud on the horizon. Last night we finished with about 8900 QSO's, most of as many contacts as possible. All three stations are working at overload capacity; the coffeepot goes cold. At midnight the dismantling and pulling down of VK9RS has begun. The 6 element log periodic beam is lying already very proud on the sand. Soon to follow the 20m 4 square verticals, still glowing with corona. Our charter boat arrives tomorrow, Sunday 26th at 11.00 am (0300 UTC).

Approximately 10,800 combined QSO's were logged. A summary follows: -We made 9,400 QSO's on SSB, 1,400 on CW. Most of the contacts were made on the 20 metre band with 4,050, 3,850 on 15 metres and 10, 12, 17 and 80 metres shared 2,900 QSO's. The last QSO was at 1741 UTC hours on Saturday, 25th September, on the 20 metre band with IK4DRR.

Everything is packed up and transported to the beach, ready to go. Time for a final swim and prepare for the 24 hour sea voyage back to Broome.

Its Sunday morning - still beautiful weather. It is high tide and the two dinghies are busy, ferrying our equipment and ourselves to the anchored charter boat well outside the reef. The beach on Cunningham Island is now deserted, empty, clean and pristine again. Our footsteps in the sand are is a southerly breeze and silence.

The Rowley Shoals VK9RS IOTA DXpedition is over....

VK9RS would like to thank the many Australian &. Overseas companies and Amateurs who supported us, being with the team for the past eighteen months, helping to meet our goal, the "Rowley Shoals", In particular The Wireless Institute of Australia, VK6 Division, and the (N.C.R.G.) Northern Radio Corridor Group for underwriting all Buro QSL cards.

Special coloured double folded VK9RS QSL cards are available with return postage from the direct QSL Manager. I1HYW Gianni Varetto, P 0 Box 1, 10060 Pancalieri, Torino, Italy. Standard QSL cards are available via the Buro, from the VK9RS Manager VK6LC Malcolm Johnson.

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Division News

VK1 Notes

Forward Bias

Peter Kloppenburg

The guest speaker at the January general meeting was Michael Farrell, VK2FLR. Mike spends a lot of his time on VHF, in particular with the use of the moon as a reflecting medium on 2 metres. This mode of communication is known as EME, short for Earth-Moon-Earth. Mike said that to be successful in this work you need a sensitive receiver with a noise figure of 0.3 dB using gaAs-FETs in the front end, a powerful transmitter, a very directional and rotatable antenna, together with audio filters to reduce the receiver bandwidth down to 25 Hz. Mike had a lot of fun with this work over the years, as he build everything himself and successfully made contacts with other EMEers in all the continents. Mike explained that EME-CW signals are buried in the noise and recovered by passing the detected baseband through audio filters. As a consequence, AM or FM is impossible because of their wider bandwidths. Other problems communicating with amateurs halfway around the world is pathloss and rotation of polarisation. The total distance is half a million km causing RF losses of 252 dB. The windows of opportunity are only about half an hour, when two stations on either side of the earth can see the moon at the same time. Antenna elevation is then no higher than 15 degrees. At those angles the atmosphere plays havoc with polarisation. For those of us who would like to know a little more, Mike provided URLs of the following EME websites which provide details at various levels of complexity:
http://web.wt.net/~w5un (EME primer), http://www.webcom.com:80/~af9y (AF9Y EME, SETI, DSP), and http://ham.te.hik.se/homepage/sm5bsz/index.htm (SM5BSZ Advanced EME topics). After Mike's talk, the meeting continued with the presentation of certificates of appreciation to four ACT radio amateurs who did great work assisting the Scouts Association during the JOTA/JOTI event last year. The ceremony was conducted by Scout Master David Lyddieth (VK1DL), and recipients of the framed certificates were Philip Longworth (VK1ZPL), Bernard Kobier (VK1KIP), Raymond Reinholtz (VK1PRG), and Peter Westerhof (VK1NPW). Next item on the agenda was the interference problem of the Mt.Ginini 2-metre repeater. Gilbert Hughes (VK1GH) gave details of what caused the problem and how it was going to be resolved. He said that one of the AirServices Australia (ASA) antennas on the shared multi-purpose tower had corrosion, oxidation, and/or rust in or about one of its elements. This caused rectification of carrier signals and resulted in mixer products with frequencies at VHF, and in particular on the receive frequency of the WIA 2-metre repeater. Every time two of ASA's transmitters were being keyed, the repeater would be activated and transmit audio from both these carriers on its own carrier. Gilbert talked about the futility of taking test equipment up on the tower, such as spectrum analysers and RF voltmeters. They were swamped by the high levels of RF floating about, and it was impossible to take reliable measurements. After much deliberation, a recommendation was formulated, and accepted by ASA, to change the frequency of one of their transmitters. This will take a few weeks as some parts must be made up and some ordered. By the time you read this, the Mt Ginini repeater problem is likely to be solved. The last item on the agenda was the Five Words per Minute (WPM) issue. As most of us are aware, the Morse examination requirement for the full call in the USA, Sweden, and the UK has been reduced to 5 wpm. For a number of reasons it is appropriate that Australia follows suit. Supported by a handout with all the relevant points, Gilbert Hughes, our President, lead a discussion on the various issues associated with the reduction of the requirement. At the end, a vote was taken which resulted in a majority of the members wanting a reduction in the Morse examination requirement from 10 to 5 wpm. The next general meeting of the Division will be held at the Griffin Center, Civic, Canberra City, on March 27, 2000. Cheers to all.

VK2Notes

Pat Leeper VK2JPA
patleep@bigpond.com

Members are reminded that the Annual General Meeting of the VK2 Division will be held on Saturday 15th April at Amateur Radio House, 109 Wigram Street, Parramatta. All members are requested to attend.

The QSL Bureau has had a busy year, handling approximately 32,500 cards inwards, and the same number outwards. Our thanks again to the hardworking members from the Westlakes Amateur Radio Club who are the backbone of the Bureau. The next posting will be in early April, the following one in July.

The VK2 Division has been issued the callsign AX2000 (AX two thousand) for a 12-month period and looks forward to future activations. The Olympic Games Coordinator, Geoff VK2EO, has been totally disappointed in the lack of club responses for use of the callsign and hopes to hear from more clubs in the near future

The Division will be organising an award to cover both Games periods — let your friends know overseas so they can be listening for it when the time comes.

As mementos for this very special year, the Division has ordered watches and keyrings bearing the WIA logo and the

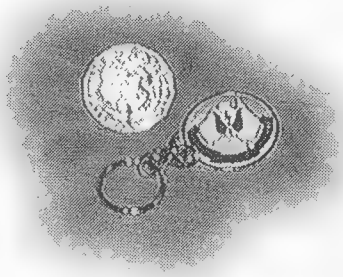
continued next page

VK2 Notes

continued from previous page

words "Wireless Institute of Australia". The watches are gold plated, analogue, with the logo in the top half of the dial and the wording in the lower half.

The keyrings (in bright gilt metal) have the WIA badge on the front, with the reverse being blank and highly suitable for engraving with callsign, etc. At the time of



submitting these Notes to the publisher, firm prices had not been decided by Council for these items. However it is anticipated they will be $7.50 for the keyring and $36 for the watch.

And finally ... The next Affiliated Clubs Conference will be on Saturday 6th May 2000. We hope to see a very good roll-up again where items of interest to all are aired and acted on where necessary.

VK4 Notes

By Alistair Elrick VK4FTL

Qnews

VK4 welcomes a new Contest Manager to the Division Team in Trent Sampson VK4TI. Trent is looking forward to the Contests coming up this year, namely Jack Files Contest (1st and 8th of July) and Harry Angel Sprint (25th of April). So I hope everyone is prepared for these ones when the time comes. Details will be in QTC and should be in AR.

Last month I mentioned the WIAQ Web page being spruced up. This will be an ongoing affair and the recent results are excellent. Well done to Webmaster Peter VK4JPH. The page contains the Qnews text, Bookshop promotions, minutes of Council meetings and other information on the Division. There is also the ftp site where the Real Audio version of Qnews is available for downloading. Thanks must go to Powerup our Internet Service Provider. They have extended our E-mails to 8 and continue to provide great service and support. Around 30 or so VK4 Amateurs are also with this ISP as testament to the excellent service. Reach the VK4 Web Page from the WIA Federal Web page at http://www.wia.org.au/vk4 or directly to http://www.wiaq.powerup.com.au The Qnews RA files are found at ftp://ftp.wiaq.powerup.com.au

Just to the north of Brisbane, the Sunshine Coast Amateur Radio Clubs 'Col McCamley Award' has gone to a couple for the first time in its 14 year history. Congratulations to Liz and Angus McBain for their tireless organising efforts and contribution to the Club. The award perpetuates the memory of Col McCamley, a founding member of SCARC and driving force in its reformation in 1978 after some 6 years of inactivity. The SCARC Packet Radio User Group had its inaugural meeting in January and scribe VK4KEL Geoff Sanders (a PP of our WIAQ) says those who made the meeting were treated to a great night thanks to Len VK4ALF and Ian VK4KIJ. A demonstration was conducted between their 2 BBS's of using commonly available Internet web browsers to collect packet mail over their LAN. The club held its AGM at the Bli Bli Community Hall on Tuesday Feb 1st. Officers elected this year were:

President: David Eyles VK4KDL Vice President: Kevin Oakhill VK4COP

Secretary: Max Magill VK4TXL Treasurer: Clem Collyer VK4WRM

Committee: Len Falknau VK4ALF, Wayne Cook VK4SWC, June Sim VK4SJ, Geoff Sanders VK4KEL, Angus McBain VK4KMC and Doug Sim VK4BP.

A little further north on February 9th, the Community Access Station on 103.9MHz in Townsville featured guests Snow VK4IFS and Gavin VK4ZZ. The host of the program Alan VK4PS had the team broadcast up to the hour Local, State, National and International Amateur news. The hour-long segment included Snow relating stories of operating portable, which will be continued on the 15th of this month at 8PM. This represents a valuable showing of the Amateur 'flag' by the TARCinc; any publicity is good publicity, great effort from the crew in Townsville. They are also gearing up for a big effort as the Club will be active for the John Moyle Field day Contest from Friday evening 17th March to Sunday afternoon 19th March at Bluewater Girl Guides Camp. TARCinc Amateur class Members, Novice or Limited calls here's your chance to work the unrestricted bands with a full call as your willing slave!

Travelling back towards Brisbane to the Clairview Amateur Radio where their May Day Weekend will be held on the last weekend in April. Mayday is on the 1st of May and also it is at the end of the school holidays. You will have to book early for accommodation at Clairview Beach Park on phone 07 4956 0190. More info from Clive VK4ACC clive.sait @ ergon.com.au

A New Club is Born

Moving just slightly to the west we welcome the newly formed Lockyer Valley Radio and Electronics Club. A few local Amateurs were surprised when they found 23 licensed Amateurs in a 15-kilometre radius with Plainland as the center and only four were associated with other clubs. They acknowledged the need for a club in the area, which inspired this new entity.

President Nev VK4TNA 5465 6953

WICEN Moreton: Graham VK4YEA 5462 2433

JOTA Liaison: Alan VK4SN, Glenore Grove Scouts, Warren VK4FJ, Laidley Scouts

The Club Net is on 146.900MHz at 7:00pm Sunday nights with the next meeting on the 27th February at the Laidley Scout Den at 1:30pm. The club will be holding a swap meet at the Laidley Scout grounds on the 16th of April. VK4XT, Dalby Club and other supporters have donated 3 radios and hardware for use on a Packet BBS. Info from VK4SN @ VK4SN.#GGR.QLD.AUS.OC alz @ hypermax.net.au or nevt @ hypermax.net.au)

The paperwork for changes to the Pretty Gully repeater VK2RBR has finally been completed and should see the end of problems between Ewans repeater and the repeater in Ipswich. There will be no cost to Summerland as the expense of this change is being met by the WIAQ. Ewan McLeod VK4ERM will be doing the changeover and Summerland requests anyone who can help him to do so if he needs assistance.

73's from Alistair

VK7 Notes

Early February in a really busy time around the branches of our Division. Many of the readers may not realise that the three 'clubs' around Tasmania are actually branches of the Tasmanian division all hams involved being W.I.A. members.

All had their annual meetings and under is a run-down of the principal officers of those branches,

SOUTHERN BRANCH, (Hobart Area)

President — Scott Evans, VK7HSE Vice-President — Stephen Clarke VK7SV

Secretary — Dale Barnes VK7DG Treasurer — Richard Rogers VK7RO

NORTHERN BRANCH (Launceston area)

President — Al. Burke VK7AN Secretary/ Treasurer — Tony Simmonds VK7TNE

NORTH-WEST BRANCH (Latrobe west)

President — Robert McCulloch VK7MGW Vice-President — Bob Cropper VK7BY

Secretary — Tony Bedelph VK7AX Treasurer — Terry Ives VK7ZTI.

Nominations are coming in well for our Divisional Council to be elected in March. I always feel that when we see a lot of nominations requiring an election it is a sign of an active, healthy organisation.

At the same time as our annual meetings each branch invited ALL amateurs to come and have their say on the morse issue. Two of our branches last year passed motion requesting morse be dropped as an examination requirement and all branches at these special meetings practically unanimously voted for the interim 5 wpm. proposal.

The Northwest branch is gearing up for the big 'Rally Tasmania' to be held on the 17th/19th. February. Our rally co-ordinator, Phil, VK7PU, is thrilled with the number of volunteers - 23 - offering their help, including some ham friends from Hobart coming up to enjoy themselves (?). Perhaps we'll have more news and pics. in the next issue.

Our web-page co-ordinator is pleased with the number of 'hits' this page is getting. Have YOU accessed it ?. Look for www.wia.tasnet.net and see what's happening on the action island.

Cheers for now. Ron, VK7RN, State President.

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These old timers are as good as new

The Great Receiver Set Up is finally ready

John Wright
4/33 Kerrie Cresent
Peakhurst 2210

The finishing touches to the great Receiver Monitoring Set Up are almost complete. As you may be aware, about 6 months ago in *Amateur Radio*, I described what needed to be done in collecting all those old radios, just junk parts etc of yesteryear. [Monitoring Station of Yesteryear *Amateur Radio* July 1999 page 51].

Well the set up at Ermington in Sydney's mid-west is finally almost finished. Opening day was Saturday 26 February at 2pm. For those who are interested the phone number for directions is 02 9533 6261.

On display are about 100 old valve receivers, all in their racks, the vast majority of which have been brought back to life with some tender loving care from my friend Robert Varga, and help from both Ian O'Toole and Ray Robinson whose enthusiasm is always at 100%. I outlined the purpose of some of these sets in an earlier article. Some of the many working sets on display will be the Admiralty B40, or should I say all 17 of them! There are Kingsley AR7's, AR8/AT5 combination, and a complete Wireless No II set ex SK VK2PA This fulfils Peter's promise that the sets are kept in going condition: AMR300's, AMR100, AR88, HRO a beautifully built homebuilt version of the HRO, Hallicrafters SX24, SX32, SX99, Hammerlund HQ110, HQ145, a beautiful National NC300, and of course a receiver monitoring set up is not complete without a Collins R390A and a R391. The British sets also get a run with Eddystones, a Racal 17E and general Electric BRT402, closer to home the AWA set CH6B and the big heavy Argonaut CR3D.

No monitoring receiving station is complete without frequency measurement. This is done with the 14 BC221's frequency meters: yes, all 14 of them. At the moment some are good door stoppers, but we will make them work!

Once again, thank you to the amateurs who have donated or sold to me radios, parts and junk to get the station going. I am always looking for more, and every couple of months you will see the ads in the classified for these items. Heavy unloved dusty, yes give me them all. Give me a hernia (the CR3D came close), give me a call.

ar

CLUB NEWS

News from the Moorabbin & District Radio Club

Radio on Rails next month

Buoyed by the success of its previous two *Radio on Rails* Fun Days held last year, Melbourne's Moorabbin & District Radio Club is holding its next *Radio on Rails* on Sunday April 9.

Radio on Rails encourages amateurs to operate from trains and trams around Melbourne. Participants get to experiment with VHF/UHF portable equipment and antennas and demonstrate amateur radio to the general public. Entrants also meet other contestants, thanks to the unique 'eyeball contact' rule.

The rules for *Radio on Rails* appear below. There are no changes from last time. Both home and train/tram mobile stations may enter. Participants are invited meet for lunch afterwards at a city venue to be arranged on the day.

MDRC Radio on Rails Fun Day Rules

Object: To make contact with operators on board trains and trams around Melbourne.

Date: Sunday, April 9, 2000

Time: 9am - 1pm

Bands: FM voice segments of two metres and seventy centimetres only

Mode: FM

Sections: A. Transmitting Mobile (in train or tram, also includes waiting at railway stations or tram stops)

B Transmitting Home (includes operators at home or in a car)

C Listening Mobile (in train or tram, also includes waiting at railway stations or tram stops)

D. Listening Home (includes listeners at home or in a car)

Contacts: Train or tram mobile stations may work (or hear) any station for points. Home station entrants may work (or hear) train or tram mobile stations only for points.

Repeat contacts: Repeat contacts are valid for scoring purposes provided at least one hour has elapsed between them.

Use of repeaters: Contacts on repeaters count for scoring purposes.

Exchange: Train or tram mobile stations give their nearest railway station, tram route number or tram stop location (if waiting). Home stations give their suburb. No serial numbers are required.

Eyeball contacts: Stations in Sections A and C may claim extra points for 'eyeball contacts'. An eyeball contact is defined as one where participants can shake hands with one another on a train, tram, railway station or tram stop.

Prearrangement of eyeball contacts before the contest start time is **not** allowed. However, eyeball contacts may be arranged during the contest period on two metres or seventy centimetres FM only. Unlike with radio contacts, entrants cannot claim extra points for repeat eyeball contacts with the same person. Amateurs or SWLs not active in the contest cannot be claimed as eyeball contacts.

Scoring: Score 1 point per station worked (or heard) on each band. Total score is the number of radio contacts made (or stations heard) on all bands plus the number of valid eyeball contacts made.

Logs: Logs should show time, frequency, callsign and exchanges for each contact. Eyeball contacts should also be logged. Train or tram mobile entrants should staple their used Met ticket to their log. Where this is not practical (e.g. ticket remains current after the contest), a signed photocopy of the ticket will be accepted in lieu.

Logs should be posted to *Radio on Rails*, MDRC, PO Box 58, Highett, Vic, 3190. Logs should be received by 31 April 2000.

Certificates: These will be awarded to the first three placegetters in each section. Other entrants will receive participation certificates.

Results: Results will be announced in the WIA's *Amateur Radio* magazine and on the MDRC's weekly news transmission (8pm Wednesdays, 146.550 MHz).

This month's MDRC activities

With the New Year now in full swing, there's plenty to do at the MDRC. Important dates for this month include:

- Wednesday March 1: *APC News* transmission. 146.550 MHz, 8:00pm.
- Friday March 3: MDRC Social meeting. Start 8:00pm.
- Monday March 6: Club Net. 146.550 MHz 7:30pm.
- Monday March 6: MDRC committee meeting. 8:00pm.
- Tuesday March 7: Tuesday morning coffee group. Start 10:00am.
- Tuesday March 7:Tuesday evening hobby/technical group . Start 7:30pm.
- Wednesday March 8: *APC News* transmission. 146.550 MHz. 8:00pm.
- Monday March 13: Club Net. 146.550 MHz, 7:30pm.
- Tuesday March 14: Tuesday morning coffee group. Start 10:00am.
- Tuesday March 14: Tuesday evening hobby/technical group. Start 7:30pm.
- Wednesday March 15: *APC News* transmission. 146.550 MHz, 8:00pm.
- Friday March 17: MDRC General meeting. Start 8:00pm.
- Monday March 20: Club Net. 146.550 MHz, 7:30pm.
- Tuesday March 21: Tuesday morning coffee group. Start 10:00am.
- Tuesday March 21: Tuesday evening hobby/technical group. Start 7:30pm.
- Wednesday March 22: *APC News* transmission. 146.550 MHz, 8:00pm
- Monday March 27: Club Net. 146.550 MHz, 7:30pm.

- Tuesday March 28: Tuesday morning coffee group. Start 10:00am.
- Tuesday March 28: Tuesday evening hobby/technical group. Start 7:30pm.
- Wednesday March 29: *APC News* transmission. 146.550 MHz, 8:00pm

Meetings are held at the Combined Clubrooms, Turner Road, Highett (Melways 77 J9). Look for the archery range, flyfishing pond and the tower.

Make the MDRC your Club

New members are always welcome at the MDRC. If you'd like a brochure and membership application form, write to MDRC, PO Box 58, Highett, 3190. Or see our website at http://www.mdrc.org.au for further information about the Club. Membership subscriptions are currently $25.00 full and $20.00 concession.

Peter Parker VK3YE
Publicity Officer Moorabbin & District Radio Club
parkerp@alphalink.com.au
(03) 9569 6751

Adelaide Hills Amateur Radio Society NOTES

In January AHARS went to the SCARC Hall for a sausage sizzle and combined meeting. The assembled amateurs and spouses were then given a big screen video show of the tour of the USA taken by four VK5 amateurs, VK5ZBR, VK5ZK, VK5ZCK and VK5ZWI.

The main aim of the tour was to visit the Hamvention in Dayton held on the 2nd weekend in May each year. We have all heard of Dayton and how big it is but now we have seen it with our own eyes. It is amazing, five enormous hall full of stands and a Flea Market area as large as the car parking area around one of our major football venues. Something like 20,000 people go there each year. Unbelievable and the things we saw on sale were equally unimaginable here in Australia.

However, Dayton was not the whole trip. Most of the tourist attractions were fitted into the itinerary, Yellowstone National Park, Niagara Falls and the NASA facility at Cape Canaveral. There they were amazed to be offered tickets to see a Space Shuttle launch the next morning. When they had been planning this trip one of the things they all wanted to see was a launch but they had reluctantly decided that without travelling back and forth across the US several times this was one part that they were going to have to miss. To discover that there had been enough changes to the launching schedule, that they actually were there on the right day after all, was too much to believe.

The rush to pay their money was too fast for the eye to see. They were not quite so thrilled when they realised that they would have to be ready to leave their hotel at 3.30am to be in time to get to the busses that would take them to the viewing area. However they gritted their teeth and put in an early call for that time. After Dayton this was possibly the highlight of the trip. Sharing it vicariously was enjoyable for members of both clubs, I am sure.

It was a most enjoyable evening and a good start to the year.

Annual General Meeting

AHARS will hold its AGM on the third Thursday in February which will be followed by a talk by Graham VK5ZFZ about loudspeakers their construction and repair. We all have several loudspeakers in our homes and shacks but rarely consider them. This should be an interesting talk, the first of many planned for the year.

If any amateurs are visiting VK5 and are in Adelaide on the third Thursday of the month they are welcome to join the regular members at the Blackwood High School, Seymour Avenue, Blackwood at 7.30. You can be sure it will be an interesting and pleasant evening.

An Invitation from the Radio Amateurs Old Timer Club

The Radio Amateurs Old Timer Club will have its luncheon and Annual Meeting on Tuesday, March 14. Amateurs belonging to other clubs are invited to join with us.

The speaker will be Mr Peter Young, the area manager of the ACA.

This will be speaking on the huge on site task of licensing, monitoring and sorting interference problems of the many hundreds of radio devices that will be in use at the Olympic Games

An excellent three course meal, including refreshments, will be served at the very reasonable cost of $25 per head.

The location is the Bentleigh Club in Yawla Street, Bentleigh, Melways map 68 B11. Firm bookings are essential, no later than Thursday, March 9 with Arthur Evans, VK3VQ, 3/237 Bluff Road, Sandringham 3191, telephone 9598 4262.

Hope to see you there, 73

Allan Doble VK3AMD (President)

52nd Urunga Radio Convention

Easter Weekend - 22nd & 23rd April

The Urunga Convention will be on again this Easter weekend, the 22nd and 23rd April. The usual events and hunts will be run and special events for junior hunters will be organised on 2 metre and 80 metres.

An invitation is extended to everyone who can attend this convention. The photo shows some of the contestants in a 2 metre hunt, after the event, in Pine Creek State Forest north of Urunga in 1988, the 40th convention.

Best 73s

B J Slarke VK2ZCQ

A 2 Tone Generator for Testing SSB Transmitters

Keith Gooley VK5OQ
Torr-Crest
Tenafeate Court
One Tree Hill SA 5114

Photo 1: 2 Tone Generator Front Panel

Here is a simple little piece of test equipment which will enable you to feed an audio signal into a Single SideBand (SSB) transmitter to test its Peak Envelope Power (PEP) output and check for distortion of the signal.

An audio signal consisting of two non-harmonically related tones has been traditionally used for testing SSB transmitters because simply feeding a single tone into the transmitter's audio section will give a single frequency at the RF output. This has the disadvantage of not easily being able to check for distortion due to non-linearity in the various stages of the transmitter. In addition, only the continuous power output capability of the transmitter can be measured as there is only one continuous frequency existing at the output. With two tones feeding into the transmitter, clipping of the RF waveform is easily seen on an oscilloscope and the PEP output of the transmitter may be measured. This is a more relevant measure for a transmitter designed for voice communication or other modes with a high peak to RMS ratio.

Design and Operation

The generator consists of two audio oscillators, a mixing amplifier, an output buffer and a simple power supply. The oscillators are the Wien Bridge type known for low distortion. The Wien Bridge network is shown in Fig. 1. R1 = R2 and C1 = C2. This circuit has the characteristic that when an AC voltage is applied between the input and earth, the output voltage will be exactly in phase with the input at one frequency only and at that frequency the amplitude of the voltage at the output will be exactly one third of the input. This frequency is given by the equation:

$f=1/(2\pi R1C1)$

An operational amplifier (opamp) is placed between the output and input with just enough gain to make up for the one third voltage drop and the circuit oscillates.

All such oscillators require a means of controlling the amplitude of oscillation otherwise it would increase until the amplifier was driven into clipping resulting in severe distortion. In this version of the Wien Bridge oscillator, the amplitude is controlled by the positive resistance with temperature of an incandescent light globe. At room temperature with no current

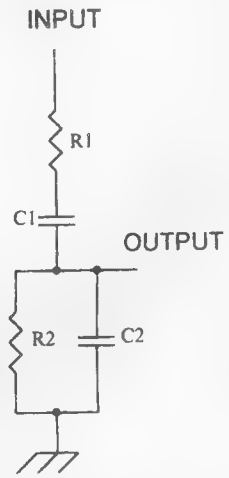

Figure 1: Wien Bridge

through the globe, the resistance is typically one tenth of the resistance when the globe is at its rated temperature. The globe is part of a negative feedback loop around the opamp and as the output voltage increases so does the voltage across the globe and its resistance increases with the heating up of the filament. In this design, I used a 50 volt globe so it never gets near incandescence. The increase in globe resistance causes the

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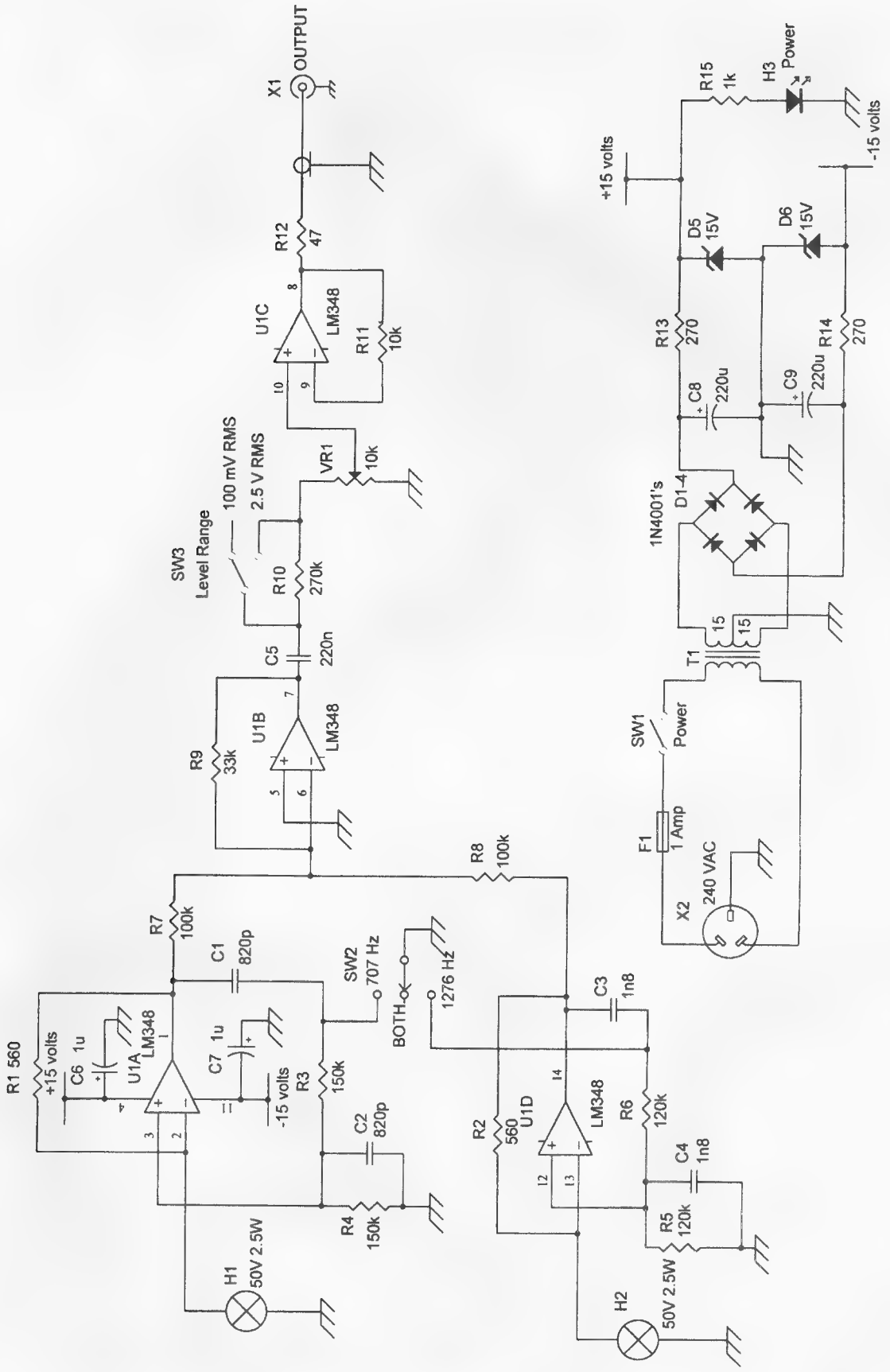

Figure 2: 2 Tone Generator Circuit diagram

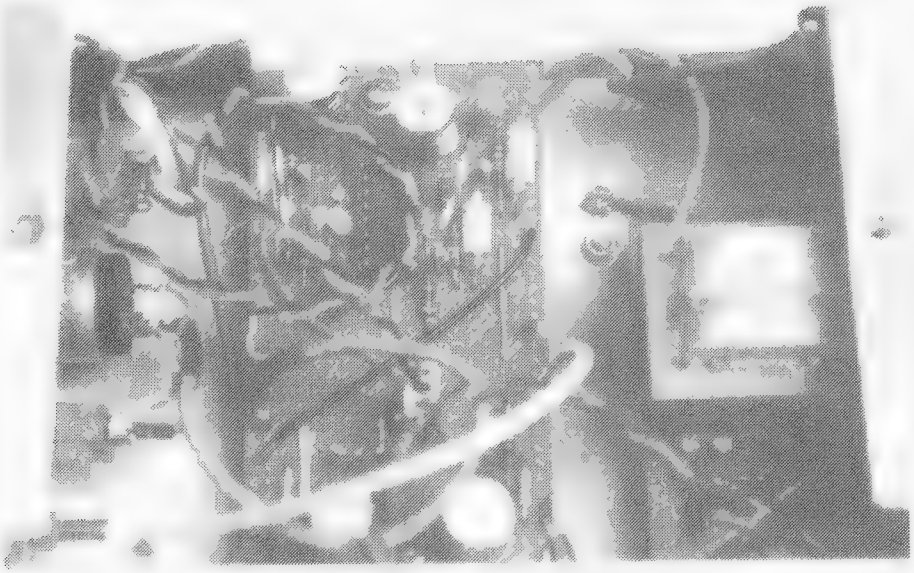

Photo 2: 2 Tone Generator Internal view

continued from previous page

negative feedback to increase, reducing the gain and so equilibrium is reached when the negative feedback just balances the loss in the Wien Bridge. This means that, referring to the circuit, Fig. 2, the resistance of globe H1 is half that of R1 when oscillation has stabilised.

C1, C2 , R3 and R4 form one Wien Bridge while the corresponding components C3, C4, R6 and R5 form the other. Either oscillator can be disabled by switch SW2 shorting out part of the Wien Bridge for situations where only one tone is required. In order to get enough voltage on the globe to make its resistance rise significantly, the opamps are powered with as high a DC voltage as possible. With the component values and globe shown in Fig. 2, the voltage at the output of each oscillator is about 7.5 volts RMS or 21 volts p-p. This is reduced to about one third of that value in the mixer stage, U1B. U1C is a unity gain buffer with level controls between the two amplifiers. SW3 selects high or low output voltage range while a 10 k log potentiometer, VR1 gives fine adjustment of the output level. The low level output is suitable for microphone inputs to transmitters while the high level setting gives about 2.5 volts RMS output. The resistor R12 is included to give an approximation to a 50 ohm output impedance; not that audio oscillators are commonly used in 50 ohm systems but the resistor also provides a measure of protection to the output buffer opamp should the output be short circuited.

The power supply is relatively simple and any voltage which is high enough to prevent the opamps clipping with the chosen globe type will be adequate. The voltages don't really need to be regulated but caution should be exercised to ensure that the supply voltage rating of the opamps is not exceeded. For TL074, LM348, 4136 etc quad opamps and many single and dual opamps the maximum is +/-18 volts. I used zener diode regulators as I had them on hand but 3 terminal regulator IC's could also be used with appropriate bypass capacitors. The PCB is laid out to take either.

Component Selection

The globes are probably the trickiest component to obtain. They should be as high a resistance as possible so that R1 and R2 are not so low as to load the opamp excessively and as low an operating voltage as possible so as not to require too high a signal voltage at the oscillator output. The globes I used have a hot resistance of 1000 ohms, a cold resistance measured with a DMM of 110 ohms and the resistance is half of R1 or R2 ie 280 ohms when there is 2.5 volts RMS across it. These globes were obtained from Vorlac Industries in Melbourne, a surplus electronic component supplier. They may or may not still have stock by the time this is published. Cat # Z21052. A 28 volt 24 mA globe would probably be suitable. These are available from Farnell Electronics cat # 328-881 or 620-518. One circuit I have seen specifies a 10 volt 14 mA globe but I don't know if these are available in Australia. The commonly available 12 volt 50 mA globes ("grain of wheat" and the like) have about one quarter of the resistance and so R1 and R2 would need to be reduced to about 150 ohms. Then it should work provided the opamp will drive such a low resistance.

Opamps. Virtually any single, dual or quad opamp could be used subject to the power supply precautions mentioned earlier. Although the LM348 is specified on the circuit, I actually used a TL074. A note of warning, the LM349 was available very cheaply from a disposals source in Adelaide a year or two ago. This opamp is an uncompensated high speed version of the LM348 and as such is not guaranteed stable below voltage gains of 5. Since all four amplifiers in this design are operated at low gain, the LM349 is not recommended. I tried one and it made a good 2 MHz oscillator rather than an audio one!

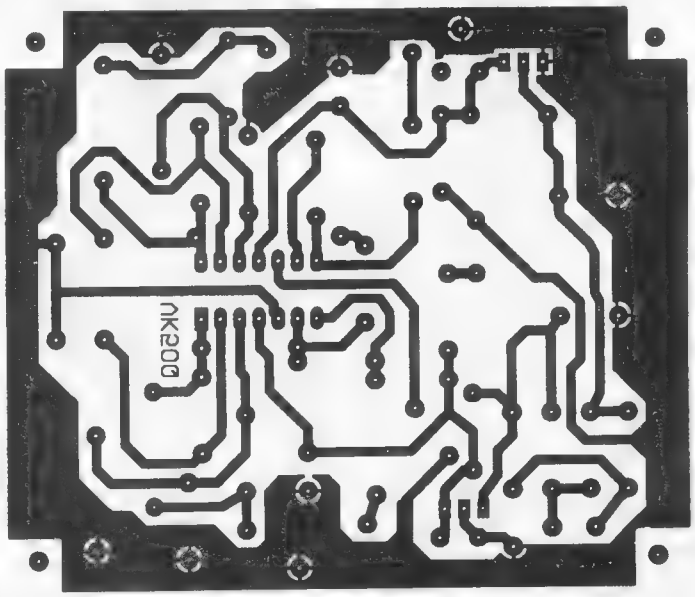

Figure 3: Top view

Wien Bridge Components. The values of C1 - C4 and R3 - R6 determine the frequencies of oscillation. Those shown on the circuit diagram, 707 Hz and 1276 Hz are the result with the component values shown. The two frequencies can be anywhere from 500 Hz to 2 kHz and as previously stated, the frequencies should not be harmonically related because of the difficulty of separating harmonic distortion from intermodulation distortion. I used the capacitor values shown on the circuit because I had on hand some good stability polystyrene capacitors. Any plastic film types should be OK and if you have some of a particular value, the resistor values can be adjusted to give suitable frequencies. Obviously SW2 is optional. It can be left out if you don't require the facility to have only one tone at a time.

Power supply. The transformer I used is an Arlec type 75061 with two 15 volt 1VA windings. Alternatively, Dick Smith cat # M2856 would be suitable with plenty of spare capacity. The filter electrolytics should be a minimum of 100 µF and any value up to several thousand µF could be used. A 25 volt rating would suffice.

Construction.

Development was initially carried out on an experimenters' plug-in board and the generator was then built on strip board. A PCB layout and component overlay is provided for those who wish to use this method of construction. The PCB caters for both zener diode and three terminal IC regulators. If you use 3 terminal regulators leave out R13, R14, D5 and D6 and include C10 and C11 as well as U2 and U3. C10 and C11 are 100 nF multilayer ceramic capacitors.

The generator is housed in a metal cabinet 100 x 150 x 60, DSE cat #H2742. These are quite economical cases but the material is fairly thin. Flexing of the front and rear panels can be all but eliminated by the addition of 12 x 12 mm aluminium angle pieces fixed to the top of the panels and secured with a screw into each through the lid. This makes a great difference to the rigidity of the case and well worth the effort. The transformer I used is a PCB mounting type so I put it and the bridge rectifier diodes on a separate strip board making sure there was plenty of insulation around the mains connections. Take care to see that mains wiring is well insulated and securely fix the earth lead to the box.

Layout of the front panel is clear from the photograph. Choice of output connector is left to the constructor as are many aspects of a project such as this. I have a preference for BNC connectors but there is no reason why banana sockets should not be used. Other types of coaxial connector would be equally suitable.

Testing.

Having completed the wiring, the usual checks should be performed. See that polarised components are in the right way and that all the strips on the strip board are cut in the right places, assuming this method is used. Power can then be applied. If an IC socket is used (good insurance I think) leave the IC out and test the power supply voltages to see that they are within half a volt or so of the required value and that the + and - are on the correct pins of the socket. Switch off, plug in the IC and the circuit should oscillate at switch-on. It will take a second or two to stabilise in amplitude due to the thermal time constant in the globe. If you have access to a CRO you can view the startup transient and make sure that there is no clipping at the output pins of the two oscillator opamps. If clipping is present and you've checked the wiring, reduce the value of R1 or R2 as appropriate. In the unlikely event that you want more output voltage and there is enough headroom before the peaks of the waveform hit the supply rails, increase R1 or R2.

If you are using a multimeter to perform checks, the RMS voltage at the oscillator output multiplied by 2.8 to convert to peak to peak, must be less than the total DC supply voltage by at least 2 volts. If the AC voltage on the multimeter is greater than this, the oscillator is probably clipping and R1 or R2 will need to be reduced.

If you wish to have the output level roughly calibrated as I did, measure the output voltage at U1B and adjust R9 to give the required maximum output voltage. The RMS readings on a multimeter are only approximate as most meters measure the average value of the AC waveform except expensive true RMS types. The meter is calibrated to read RMS for a pure sine wave. Hence for a mix of two tones, the RMS reading on a multimeter will be a bit on the low side due to the "peaky" nature of the two tone waveform.

Conclusion

The design and construction of a signal source has been described providing two audio tones intended for use in testing SSB transmitters for peak power output and linearity. The low distortion Wien Bridge circuit is used in a relatively simple design using readily available components.

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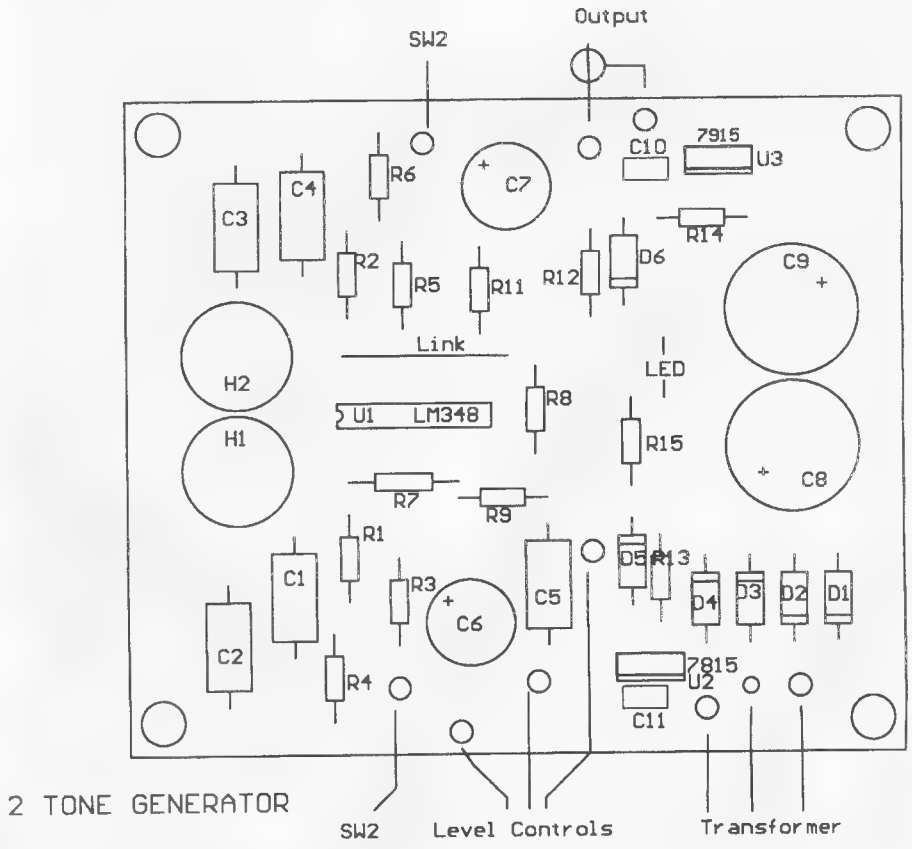

2 TONE GENERATOR

ALARA
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ALARA on the Net

Have you looked at the ALARA Page lately? This can be found at
http://homepages.tig.com.au/~bishops/alara/

Dot VK2DB Editor set up this page several years ago with the help of her son Peter (remember the front cover of AR in November 1998?) and has added to it as interesting events have occurred. Why not take a look next time you are surfing?

A number of the members of the committee are on email, watch for listings in the Newsletter. If you have a query or comment, please send one of us a message. Your feedback is what tells us whether we are serving you well or not.

If you have any items of news either for this column or for the Newsletter, please send it along either by email or by packet.

Dot's addresses are VK2DB@VK2WI and dbishop@hotkey.net.au or bishops@tig.com.au

My addresses are VK5CTY@VK5TTY or geencee@picknowl.com.au

I must admit my packet has been dead for some time but it is working again now and I hope it stays that way. My email is working well though I am not getting enough information from you. Please do something about that!

The International YL2000 In Hamilton

By the end of March all those who have indicated their interest in going to this event should have received the registration forms etc. Don't waste time filling those in and returning them so the organisers can finalise arrangements. However, if you find that you can come, after all when you had decided it wasn't possible, I am sure you could be accommodated after the closing date.

The Web Pages to look at are:-

http://www.wave.co.nz/pages/osborneg/yl2000 for information about the meet

and www.new-zealand.com/GreatSights orwww.pacificdiscovery.co.nz for tours you could take before or after the meet.

At this time the tours on offer are a Catalina Flying Boat flight over Hamilton and surrounds and a tour to Rotorua, plus a trip to the Bay of Islands, Northland prior to the meet on which a number of YLs are joining Gwen VK3DYL. There is also a possibility of a trip to Norfolk Island where you will have a chance either to work rare DX or to be rare DX. Keep watching and listening for more information as it comes to hand.

The Hamilton Gardens

In the recent WARO Magazines (WARO is the NZ equivalent of ALARA) there have been a series of articles describing the beautiful and unusual Hamilton Gardens. In these gardens there are a number of specific areas that have a particular theme. There is the Chinese Garden, the English Neo-Georgian Garden and the American Modernist Garden, each of them is a copy of its parent garden on another continent.

The beautiful descriptions of the gardens and the history of the Hamilton Gardens as a whole was written by Joline ZL1UJB. Deb VK5JD, an earlier Historian for ALARA met Joline and Celia ZLIALK when she was in New Zealand earlier this year. Deb has now sponsored Joline into ALARA.

Before Deb undertook this sponsorship the question was asked, whether it is necessary for you to hold a Full licence (or either side of the ocean) to be sponsored. There are no restrictions about Licence grade. It just makes it more difficult to talk to each other on air if one of you has a restricted licence.

The Monday Night Nets

The time of the Monday Night nets will change in March to coincide with the end of Daylight Saving Time in some States so conditions on 80 metres should improve. The half hour extra suntime of the earlier beginning to the Nets does make a difference, particularly for the Queensland and Western Australia YLs. We are grateful for the regulars like Bev VK4NBC, June VK4SJ and Sally VK4SHE who come up week after week to tell us about their activities although often they cannot hear any of our replies.

We do usually hear them well enough to complete our weather report, though. That is the first round topic, most weeks. The range of temperatures and the patterns of the rains are quite fascinating. Our country is so enormous and covers so any climate types.

The timing of our garden produce is another illustration of our seasonal differences. The tomatoes may be finished in one place before they have ripened somewhere else.

Many of us are bird-watchers and many of us live with bushland quite near so there is usually something new to share with each other. The variety and type of birds and animals we see is amazing. Why don't you listen in or even join us on or about 3.580 MHz one Monday 1000Zulu till Daylight Savings Time ends and 1030 after that.

The ALARA Contest

The outright winner of the of the Contest and the winner of the Florence McKenzie Trophy was Pat VK3OZ. Following close behind her for top score (four points difference) was Susan VK7LUV (ex VK4LUV). Congratulation to you both. Two regular participants took out the Top DX score, Celia ZL1ALK) and Top ZL OM (Dave ZL1AMN) with Alan ZK7JAB taking out the top VK OM.

The number of logs sent to Marilyn VK3DMS was very disappointing this time, especially after making repeat contacts possible had been so successful the year before. From the numbers of stations contacted there must have been many more people participating than those who sent in their logs but conditions on the bands was not nearly as good last November.

Quite a bit of effort is involved in arranging to hold a Contest and in checking the logs etc., so it is a shame that we don't all manage to send in our logs.

There is a possibility that some changes could be made to the ALARA Contest to try to improve the situation. Watch this space for information.

ar

ARDF

Ron Graham VK4BRG
PO Box 323 Sarina Qld 4737

The early "sniffer" gets the fox

Later this year, the next International Region 3 ARDF Competition will be held in China. So far, I haven't heard anything regarding an Australian team being involved. The financial burden of attending one of those events is always a problem. Should anyone be interested, they should contact the Australian ARDF coordinator, Jack, VK3WWW. Indications from the US are that there is quite a lot of interest in the event, even to the stage that some elimination events may be needed to select the competitors.

Sydney Circa Late 1950.

The remainder of this month's column will endeavour to cover ARDF in Sydney around the late 1950's era, then most definitely called "fox hunting". At that time I was VK2ZBG, the only other person that I have kept in vague contact with who was involved in "fox hunting" in those days is Allan, VK2RX who back then was VK2ZAL. Allan was navigator/radio operator on many occasions, while I did the driving.

I remember a popular starting point being a water tower in the suburb of Canterbury. This was a normal suburban area but quite elevated. The elevation helped you to initially hear the fox, which was (often) quite a distance away. Thus we only held the one event per evening. From memory, there was an average of 6 to 8 cars participating in those monthly events. On occasions we would go for coffee at a late night establishment after the event.

AM Days

This was back in the Amplitude Modulation (AM) days with crystal locked transmitters and crystal locked converters feeding a tunable receiver being the norm for 2 metre operation. Thus most operators had "their" frequency and one knew to look for that particular person. Their home, or base station, frequency wasn't always the same as their mobile frequency. It all depended on what crystals were available from "disposals" at the time. As these disposals crystals were often on the same frequency, it was common practice to grind "a bit off them" so as to end up on ones own unique frequency. This frequency was determined largely by luck in the grinding process, the main criteria was not to end up on someone else's frequency!

The Valve Era.

As all this happened before the age of the RF transistor, equipment was all valve. Transmitters generally used 8 MHz crystals, that frequency being multiplied up to 144 MHz, which required 3 stages of multiplication. The output stage was, in general, just a few watts. Any figure above this required valves that were harder to obtain, difficult to supply with the necessary DC power and, of course, needed a larger AM modulator as high level (or plate/screen) modulation was normal.

Crystal locked converters were all valve and gave a number of us our first introduction to overtone oscillators. These were used to try and avoid the large number of multiplier stages otherwise required for the local oscillator in the converter. I used a 6 to 9 MHz "command receiver" as a tunable IF. These receivers were also a disposals item and were available with various tuning ranges. The 3 to 6 and 6 to 9 MHz ones being the most common. They used quite a high IF frequency, which reduced their selectivity. However, we used to modify them to a double conversion design with a low IF frequency and end up with quite a reasonable receiver.

Power supplies were a problem. Being fairly serious, I fitted a 28 volt (again disposals) aircraft generator to my (in that era, 6 volt) Holden. Two 12 volt batteries were carried in the boot. The 24 volt supply meant I could use, the then common, disposals 24 volt genemotors to provide the HT for the valve equipment.

Introducing The Transistor.

Germanium transistors, mainly low frequency and switching types were becoming available. We were starting to use the TO-3 size switching devices for DC to DC power supplies. Building these provided good winter entertainment in front of the fire, winding the required torrodial transformers. Lots of turns were needed for the secondary windings, though I remember the voltage doubler configuration being popular as this meant less of those secondary turns.

DF Antenna.

Antennae were varied .. I used a 3 element horizontal yagi which had the aluminium support tube passing through a hole drilled in the body work in front of the left hand side of the windscreen. This hole lined up with a hole in another bracket that was mounted on a parcel shelf under the dash. Thus the antenna could be easily turned from inside the vehicle. And therein lies a story. A long screw and nut were fitted through a hole through the tube above the bottom bearing. The idea was that the long part of the screw that protruded through the nut "pointed" in the direction of the "front" of the beam. On the night in question we ended up in some paddocks out west of Liverpool. Suspicion was eventually aroused as we ended up further in the paddocks and the average signal getting weaker. Investigation revealed the screw had been fitted the wrong way, which meant we were carefully 180 degrees off course! I would image we double checked that item on future hunts. Oh, and a "high tech" cork was used to block the hole when the antenna wasn't fitted.

The Early "Sniffer".

Naturally hiding places were as devious as could be devised. Often access to the "fox" wasn't obvious even though it was mostly in a vehicle, or not far from it, due to the lack of really portable equipment and a power source. So it became apparent to me that having some sort of, what is now known as a "sniffer", could assist. Being able search on foot, could, in some situations, be quicker than trying to find suitable access roads or tracks for the car.

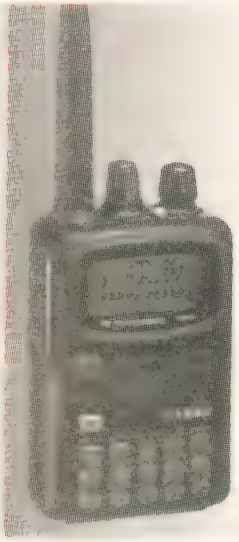
So a sniffer was designed consisting of a full size close spaced two element yagi feeding a 50 micro-amp meter via a diode detector etc. This worked remarkably well over a reasonable distance assisted, no doubt by the fact that most of the hidden transmitters were the owners mobile transmitter running a few watts. It could be a different story these days with the lower powered "foxes".

ar

DON'T MISS THE ACTION!

VX-5R 6m/2m/70cm Deluxe Hand-Held

Tiny yet incredibly rugged, the VX-5R provides 6m, 2m and 70cm amateur band operation with 5W output as standard (4.5W on 70cm), made possible by a unique PA design and a super high capacity 7.2v 1100mA/H Lithium-ion battery. Plus, ultra-wide coverage VHF and UHF as well as AM medium-wave and shortwave reception facilities are provided, along with a large backlit dot-matrix LCD screen. All this in a diecast aluminium enclosure just 58 x 87 x 28mm WHD (without knobs or antenna)!



Features

- Tx: 50-54, 144-148, 430-450MHz
- Rx: 0.5-1.8MHz, 1.8-16MHz, 47-729MHz, 800-999MHz (cellular blocked)
- Full feature keypad, CTCSS encode/decode, digital code squelch
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- 5 battery saving systems, plus Tx/Rx usage monitor
- Spectra-Scope™ for monitoring adjacent channel activity
- Comes with FNB-58LI Lithium-ion battery, flexible antenna and AC adaptor/charger

D 3670

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2 YEAR WARRANTY

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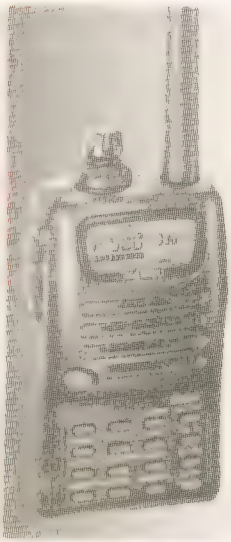
FT-50RD 2m/70cm Handheld

The Yaesu FT-50RD is an amazingly compact 2m/70cm amateur band handheld transceiver which provides MIL-STD 810 shock and vibration resistance, super wideband receiver coverage, simple menu settings for most functions, and compatibility with the optional Yaesu ADMS-1E software/interface package for PC programming of many functions.



Other features include:

- Tx 144-148MHz, 430-450MHz
- Rx 76-200, 300-540, 590-999MHz (cellular blocked)
- FTT-12 keypad provides Digital Voice Recording, CTCSS/DCS scanning, and CTCSS encode/decode
- 2m/70cm RF output: 2.5, 1.0, 0.1W standard, up to 5W with 9.6V battery or 12V DC socket
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- Dual watch allows monitoring of sub-band activity
- Direct FM modulation for better audio quality
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- Comes with FNB-40 slimline 6V 650m A/H Nicad battery pack, flexible 2m/70cm antenna and modified M-9626 AC plug pack adaptor for Nicad charging.

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Yaesu FT-90R 2m/70cm micro mobile

Another engineering breakthrough from Yaesu – a tiny dual-band mobile rig with high power output, a remoteable front panel, and a rugged receiver front-end. The FT-90R provides 50W RF output on the 2m band as well as 35W output on the 70cm band, a solid diecast casing with microprocessor controlled cooling fan for reliable operation, and a large back-lit LCD screen, all in a package measuring just 100mm x 30mm x 138mm.

Also includes:

- Wide dynamic range receiver for reduced pager breakthrough
- Huge receiver coverage – 100-230, 300-530, 810-999.975MHz (Cellular blocked)
- 180 memories and a variety of scanning functions
- Built-in CTCSS encode/decode, battery voltage metering
- Designed for 1200 and 9600 baud packet operation
- Tiny remoteable front panel (requires optional YSK-90 separation kit)

Includes MH-42 hand mic, DC power lead, and easy to follow instructions.

D 3312

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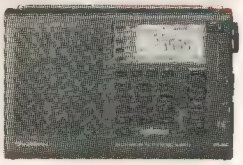
2 YEAR WARRANTY

YSK-90 Front Panel Separation Kit D 3317 **$129.95**

FOR ALL YOUR COMMUNICATION NEEDS

45-Memory Shortwave Receiver



The ATS-808 provides continuous 150kHz to 30MHz coverage, so you'll catch all the action on the shortwave bands plus medium-wave (AM bands) and, with earphones, FM stereo. You can select wide or narrow filters on SW bands (as well as attenuation for extremely strong stations) to ensure optimum reception quality under differing conditions. Requires 6 x 'AA' batteries or mains adaptor (M 9626) recommended).

D 2829

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SAVE $86

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- Keypad frequency entry • Dual time settings • Desk stand • Signal strength meter
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- Complete with stereo earphones and protective case.

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Shortwave: 1.711-29.999MHz (continuous) or in 13 pre-set SW bands)
FM: 87.5-108MHz

6m 1/2 Wave Base Antenna

A rugged Australian-made vertical antenna designed to cover the 51 to 54MHz range, with minimum SWR around 53MHz. Built using high tensile T81 grade aluminium, it's just 2.9m long with a sealed base section and 100W minimum power rating. Complete with mounting hardware.

D 4825

D&G Antennas **$69.95**

2m Heavy Duty Base Station Antenna

For use where long-range omni-directional 2m band (144-148MHz) coverage is required. This 3.4m long 1/2 wave over 1/2 wave colinear vertical antenna provides approx. 5dB gain, and is housed in a very tough single-section fibreglass radome for all-weather protection. The strong aluminium base section is fitted with an N-type socket in its base for coax cable connection.

D 4822

BENELEC **$139.95**

FT-3000M 70W 2m Mobile

An amazing 2m mobile transceiver from Yaesu with up to 70W RF output, MIL-STD 810 shock and vibration resistance, wide band receiver coverage(110-180 and 300-520MHz), dual-band or dual in-band receiver facility, 1200/9600 baud packet socket, and a very large back-lit alphanumeric LCD screen. The FT-3000M is supplied with a MH-42A6J hand mic, DC power lead, and detailed instruction manual.

D 3700

Specifications:

Frequency range:	Tx 144-148MHz Rx 110-180, 300-520 800-824, 849-869, 894-999MHz
RF output:	70, 50, 25, 10W
Sensitivity (Ham bands):	0.2uV (Main Rx), 0.25uV (Sub Rx)
Dimensions:	140 x 40 x 180mm (WHD)

YAESU

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SAVE $100

Limited stock. Some units may be ex-demo, but full warranty applies.

2 YEAR WARRANTY

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The FT-840 provides:

- SSB/CW/AM operation (FM optional)
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- Effective noise blanker
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- SSB speech processor for greater audio punch
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D 3275

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Eric Jamieson VK5LP: Looking back at an era (Part I)

Most things in life eventually come to an end and the time has come for me to leave the keyboard and cease writing *VHF/UHF - An Expanding World,* after 30 years. That was actually done with the December issue, but this is a final roundup of news and events as I have seen them during a lifetime of association with radio and electronics.

Firstly, it has been a long and happy association with *Amateur Radio* magazine, its editors and production staff. Right from the beginning I set a relatively high standard of writing and I adhered to that at all times, refusing to allow the columns to become an arena for anyone to air grievances against other amateurs, no matter how relevant, as I believed that this would serve no useful purpose for the promotion of the hobby of amateur radio.

I am also very grateful to the loyal band of supporters who, over the years, have supplied material in one form or another for inclusion in the notes, as I usually call them. Also the several Clubs and VHF Groups with their provision of their newsletters without cost. Then there have been the great number of readers, amateur and otherwise, in Australia and from overseas, who have expressed their satisfaction with the information provided, albeit somewhat sketchy at times. I have tended to stay with the communications side of VHF/UHF, leaving the more specialised modes to those better suited to their writing. Here I refer to satellite and digital communications, packet, repeaters etc., all of which have evolved with the passage of time. No one column can hope to cover everything so perhaps my choice was wise.

It did come as a surprise to find that one of the more popular segments of the notes was the "Thought for the month", so much so, that eventually this was expanded to "Two thoughts for the month" and these remain to this day. Many amateurs advised me that their wives always read the thoughts even if they read nothing else in the magazine!

Let's be nostalgic

But first, let me go back a bit into history. I was obviously born with a "valve in my hand" because my interest in radio really commenced around the age of eight years! Despite being told to refrain I could not leave the house radio to itself - at every opportunity I had to fiddle with the three dials that this battery radio boasted, at times finishing with them hopelessly out of tune. Exasperated, my father bought me a book dealing with the fundamentals of radio. It was two inches thick, its appearance was quite intimidating, so it became known as the "tome" and sat on the desk in my bedroom.

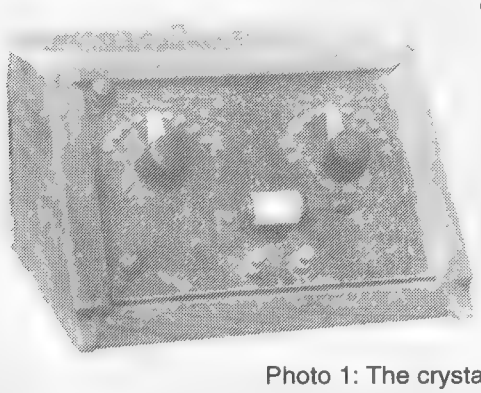

Photo 1: The crystal set

A shortwave listener

At ten years Dad bought me a three valve regenerative battery set (we had no power until 1950) for 17/6 and I quickly converted this to a shortwave radio using plug-in coils covering from 500 kHz to 20 MHz, smooth regeneration being impossible to achieve at higher frequencies. Anyway, A415 triodes were never intended to operate at such high frequencies. So commenced my shortwave listening days. It was amazing what could be heard - an aerial 100 feet long and 40 feet high in a location with absolutely no noise (no power lines) presented a noise floor which had to be observed to be appreciated, and would be the unachievable dream of everyone today.

At fourteen I provided shortwave listener notes for a column in *The Adelaide Advertiser* each Saturday. So my radio journalism had commenced! These notes continued until I joined the RAAF in 1942, where I served in radio communications for four years, spending the last two on transmitting stations.

Radio really takes a hold

In 1947 I set out to procure my amateur licence but was too busy repairing the district's radios that I put such aspirations aside until later. But I did build for myself a 15 valve battery operated communications receiver that tuned from 500 kHz to 30 MHz. It boasted two RF stages and three IF

stages, and what a grand performance that gave in the quiet conditions, including broadcast band stations from Europe and America when the path was night-time for most of the distance. Eventually I sold it to an SWL in the back-blocks of WA, but now wish I had kept it.

Still repairing radios, I moved on to 1949-50 when I produced 64 radios for commercial sale. These used a Kingsley Ferrotune Kit and worked on batteries or 240 volts AC, selected by a switch, and were very popular with the locals as the power was slowly making its way to our area, arriving in late 1950.

Amateur radio looms

It was in the early 1950s when I made my first foray into amateur radio with a mate and I constructing one metre (288 MHz) gear, a modulated oscillator for transmitting and a super-regenerative receiver. With an output of about five watts we covered the ten miles between us with ease using dipole antennas. However, we never widely advertised our clandestine operations although the neighbours knew what I was doing, mostly at night from the garage. I was now smitten by the VHF bug!

Through the good years of solar Cycle 19 (1956-59) I did much listening on 50 MHz using a Kingsley tuneable converter joined to an AR7 receiver and a modified Channel 2 TV antenna especially imported from Melbourne where television had already commenced. I logged many signals from Japan, USA, Mexico, New Zealand, New Guinea and from all over Australia. The VHF bug was really biting and I had to do something about it!

I become a radio amateur

Finally, at the urging of my friend Wally Giles-Clark (VK5ZEH then, now VK5TW), in 1961 I sat for my licence and passed at the first attempt and became VK5ZEJ. Wally and I had a lot of fun operating on 50 MHz, one at each end of the then 4 MHz wide band, operating simplex with our antennas side-on to reduce the signal strength sufficiently to allow this to happen - we were two miles apart! When we finally constructed two metre equipment we found cross-band operation a breeze.

Operating on 50 MHz in the early 1960s was an interesting experience. Most stations were crystal locked, so in order to be heard during a wide-spread Es opening, stations spread out and fully occupied the spectrum from 50.000 to 50.500 MHz. I recall on one occasion counting 44 stations using that 500 kHz! Operating procedure was to call and end by saying "tuning from 50 up or 500 down" whichever was your choice. Most chose tuning up. As you were locked on your frequency, you could follow the progress of stations as they tuned up the band working available stations on the way. From this you had a fair idea when it would be your turn to be called when the station immediately below you had completed his contact with the station you were seeking.

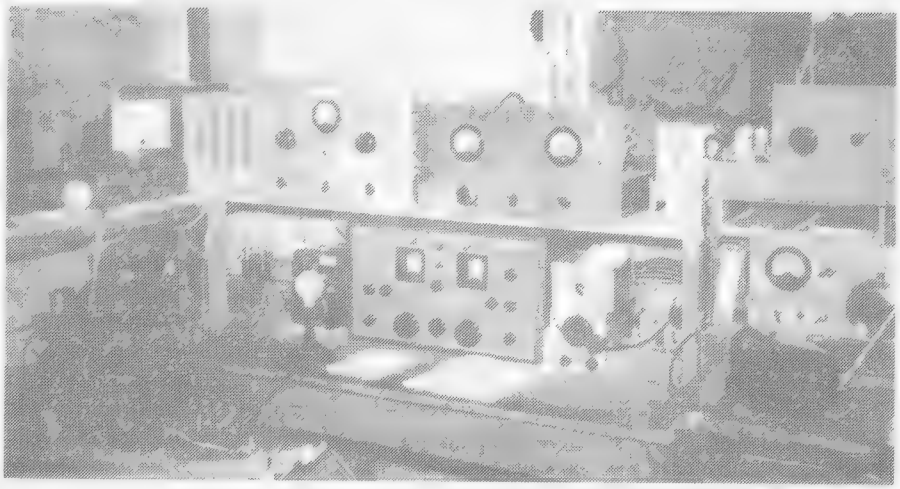

Photo 2: The VK5LP shack of the 1960s with all AM equipment

We lose part of six metres

We had the use of 50 to 54 MHz until Channel 0 commenced broadcasting, so from 1 January 1964 we lost the segment 50 to 52 MHz. This was a sad blow as it meant we were now 2 MHz higher in frequency than stations in Japan, USA and many other countries. Domestically this was not a great problem but it would become one when Cycle 20 peaked around 1969. So for the next five years we ran a campaign of informing overseas countries that we were still there, but 2 MHz higher.

Cycle 20 was relatively poor but those overseas contacts which were made, usually involved working split frequency - we listened on 50 MHz and hopefully the others listened on 52 MHz. In many cases the 50 MHz stations did not bother to listen for us on 52 MHz when they could work sufficient stations on 50 MHz. Also, their antennas worked less efficiently at 52 than 50. At different times, one could hear a VK station slip down to 50 MHz and tell the stations there, almost in a whispered voice, that we were hearing them and would they look for us on 52 MHz. Such an illegal call lasted only a few seconds but it could have the desired result of split frequency working for the VKs.

After our confinement above 52 MHz, by mutual consent a calling frequency of 52.050 MHz was introduced. This appeared to be of some value when the band had few signals, but again crystal locked stations had to spread out if they wanted contacts during Es propagation and crowded conditions.

The VFO arrives

Soon after, the wartime American Command transmitters were being rebuilt for use as a relatively stable VFO. The 3 to 6 MHz model was the most popular being inherently stable when used at its fundamental frequency as a mixer VFO with a crystal locked exciter chain. The beauty of this system was that the VFO could be allowed to run all the time and the transmitter silenced by removing the screen voltage from the doubler stage. A capacitor was switched across the VFO tuning capacitor to move its frequency out of the range of the receiver during receiving periods.

Apart from contacts when all manner of subjects were discussed - and some of these contacts were of considerable length with up to four stations involved in a round-table conversation, particularly after crossband operation became more general - we amused ourselves with six and two metre scrambles, working with the lowest possible power, reading frequencies, antenna experiments and so on.

Some interesting contacts involved up to four participants in a round-table conversation utilising both six and two metres. At other times we amused ourselves with six and two metre scrambles, working with the lowest possible power, accurately reading frequencies, antenna experiments and so on.

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On one occasion I had a contact with Rod VK5ZDS (now VK2BQJ) when we played a game of chess for more than three hours. Of course Rod won, but then he is a man of larger construction than me so it was prudent of my selfless nature to allow him to win! He will remember!

Becoming VK5LP

Then I joined the VK5 VHF Group, and over the next few years made VHF news tapes for the Sunday morning WIA broadcast and sometimes did the two metre relay. While constructing much equipment (which now extended to 432 MHz) I learned the Morse code and eventually became VK5LP. So it was in 1969 that I was nominated (pushed!) by Geoff VK5TY, the VK5 Federal Councillor, to write the VHF notes for *Amateur Radio* and was welcomed to the fold with open arms. I am still not sure whether I have yet forgiven him for making that nomination!

Writing for *Amateur Radio*

So began a saga which has since spanned 30 years. The column commenced as VHF/UHF – An Expanding World and stayed that way, because that is what VHF/UHF is really – an expanding world! I commenced at a time when Solar Cycle 20 was looming and I had hoped for conditions similar to Cycle 19. This was not to be, it was a relatively poor cycle but I did manage to work JAs, Hong Kong and a couple of W5s and some of the island countries around the Pacific.

Beacons

With the completion in 1965 and obvious success of the VK5 beacons for 52 and 144 MHz, other states were slow to follow. When I began writing the VHF/UHF columns in *AR*, I used the avenues presented there to push for an Australia-wide network of beacons and for years my columns were prefaced with a list of operating beacons. The purpose was two-fold. First to provide a list of operational beacons for the benefit of amateurs, and secondly, as the list showed which states did not have beacons, it was a subtle way of applying pressure for them to be installed. It worked because eventually every state had its beacons, at least on 52 and 144 MHz. Gradually the beacon network was enlarged to encompass 432 and 1296 MHz. Today, beacons exist in several states on all bands through to 10 GHz.

Portable operations

An activity I had always enjoyed was portable operation. This commenced around 1965 when all the heavy equipment from the shack was loaded into the station sedan and caravan and taken to some remote hilltop locality. It was no small task to take full-sized AM transmitters, modulator, power supplies, antennas and kindred equipment plus a heavy duty alternator to supply 240 volts AC.

Over the next 20 years, I did this 49 times to 31 different locations. Fortunately, as time went on, solid state equipment took the place of valves so the load was considerably lightened, but it still took a lot of organising to run equipment for four bands plus FM. I admire those, who today, cheerfully (!) go mountain-topping with eight bands! But there is still something to be said for the lure of going to a remote spot, free of power line noise, with the elevation sufficient to considerably increase the normal range from that of a home station.

AM equipment improves

Gradually my AM equipment had improved. I was rather pleased with the big modulator I had constructed. This was used on six and two metres and consisted of a pair of 809 triodes in Class B complete with high level filtering and clipping. It was capable of 140 watts output but I restricted this to 100 watts to modulate my pair of 807s running at 100 watts. The tailoring of the audio signal was so good that minimal broadening of the signal occurred when full power was applied but the talkpower was awe-inspiring, so others told me! The same modulator was used with a QQE06/40 on two metres with similar results, but in this case I turned the wick down to 70 watts of audio out of respect for the poor old 6/40!

I don't think that there is any question that, despite the advancements in technology which has seen the SSB/CW/FM transceiver take over so prominently on the VHF bands, that an AM signal of the magnitude which I could produce, would be hard to better. No wonder that on a crowded 50 MHz band I received an answer at the first call - it was better to have me out of the way and operating with someone else further up the band, than obliterating others!

For those who were actively involved during the AM days, few would disagree with the statement that they were very good days. You could have as lot of fun building your own equipment, first using crystals to control the frequency, then as techniques improved, moving on to VFO control.

ar

Part II continues next issue

INTRUDER WATCH

Gordon Loveday VK4KAL
Coordinator, IARU/WIA Monitoring Service
QTH Rubyvale Q 4702

Summary for January 2000

FREQ	DATE	UTC	EMM	DETAILS
3.560	120100	1003	A3E	R. Pyongyang, N Korea Pos ID**
07.098	25/01	0840	A3E	Rep of Indonesia varies freq*
14.098	24/01		A3E	Report only at this stage*
14.1385	24/01	0750	F7B	Ui Helscreiber type signal
14.2115	18/01	0988	F1B	RDL Moscow Nav Radio USSR**
14.290	31/01	1146	A3E	UiBC, H2 of 7.145 MHz
18.075	14/01	1213	A3E	Ui, Sounds like a Harmonic
18.100	21/01	1209	J3E	Ui, Indian, H3. Persistent

28.650 has not been observed in Australia since July 1999 so we must assume it has left our 10 mx band. All 3 Regions worked hard for this.

** It may be galling to amateurs, but these countries have over many years ignored all our attempts to remove them. We know of no means to improve the situation, but it is a shining example of what apathy can do to our legit band-space. Had we had more amateur cooperation over the last 20 years, things may have been different. Let it not happen again.

ar

REPEATER LINK

Will McGhie VK6UU
21 Waterloo Cr Lesmurdie 6076
will2@omen.net.au
VK6UU@VK6BBR

Internet Linking, but is it legal?

The UK is pushing ahead with Internet linking of some voice repeaters. In Australia this type of operation is illegal as far as I know.

This is a spin off of the no connection to the public telephone network regulation. Not only is two way Internet linking between voice repeaters illegal but so is one way linking by placing repeater audio on the internet only. I reported on a VK4 amateur being told by the ACA to cease this type of operation about a year ago. At the rate at which be are able to change voice repeater regulations in Australia don't expect to hear linked voice repeaters via the internet for a long while.

Amateur Radio

With summer in full swing and so many outdoor activities, amateur radio has taken a back seat. There are several outstanding repeater projects that need attention, one of which is the International HF beacon VK6RBP. There has been an ongoing problem with the multi band antenna for the beacon. The original R5 never had a good SWR on 18 MHz so it was changed for an R7, which worked fine until a couple of months bank when all bands except 28 MHz developed a high SWR. The intention was to replace the R7 with another R5 and repair the R7. However it appears that the R5 may have a design problem with the 18 MHz band as two have been tested and both have a high SWR on 18 MHz. This now makes a total of 3 R5 antennas all with high SWR on 18 MHz. Work is proceeding and hopefully the International HF beacon will be back on air soon.

All in a day's work in an OB Van

I know I have whinged a bit of late about being busy at work with little time for amateur radio. Well it looks like work is slowing down a bit at long last after 4 months of long hours. Working for the National Broadcaster (ABC Television) is normally not this busy. It all started with a complete re-build of a Television outside broadcast van, OB van for short. This large 8 metre long vehicle was stripped bare and re-built. There is a lot in an OB van, 10 cameras, 50 plus colour monitors, 20 input audio mixer, 20 input video mixer, 5 VHF-UHF communication systems, two of which are full duplex systems for production talk back, at least a kilometre of video cable and a kilometre of audio cable; the list goes on and on. Extras like air conditioning for staff and equipment, power distribution, very extensive internal communications (ever body has to be able to talk to ever body at an OB) also spring to mind.

There is a lot in an OB van, 10 cameras, 50 plus colour monitors, 20 input audio mixer, 20 input video mixer, 5 VHF-UHF communication systems, two of which are full duplex systems for production talk back, at least a kilometre of video cable and a kilometre of audio cable; the list goes on and on.

Twelve hour days on and off for about 3 months with few days off resulted in the OB van finished in time for a large OB, the Hopman cup. The viewer sits back and watches the tennis with little concept of the mammoth amount of equipment needed for a simple tennis match. Nine de-mountable huts, three OB vans, two other vans for video tape equipment, 20 cameras, 24 video tape machines, 8 microwave in-outs to the outside World to watch the tennis.

My contribution to this telecast over 7 days is the microwave links. Frequencies used are in the 2.5, 7 and 13 GHz bands. To set up for such a large OB requires several weeks of planning and about a week of rigging before the event. What made it complicated and difficult this time round was the year 2000 World wide telecast the day and night before the beginning of the Hopman cup. A significant amount of the equipment needed for the Tennis OB was also needed for the millenium telecast. This equipment including one of the OB vans, several other vehicles and microwave link equipment. All this equipment had to be set up for the beach concert the day before the concert, the concert OB done on new years eve, then de-rigged that night (midnight) and rigged the following morning ready for the first tennis match on new years day. A few hours sleep between midnight and the next morning was all that could be fitted in.

Microwave links involve a variety of activities, one of which is climbing and installing heavy equipment on towers and buildings. Working till midnight the night before, and then rigging tower number one next morning was job one for the day. Like most estimates of how long it takes to do a job, tower one took twice as long as thought. Microwave equipment had to be hauled up, by hand some 85 metres (270 feet), for

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reverse links from the ABC Perth studios to the tennis venue. There are several input links permanent on the tower, so these did not need to be rigged. Reverse links feed network programs for monitoring to the OB site, so the OB program can be timed into the network. Production people need to see the National program they are interfacing with for a variety of reasons. Interesting complication due to satellite and digital delays is the 3 to 4 second delay in seeing what you send to the network coming back to you. The national program that the OB slots into is delayed back at the OB site, so opening titles have to be pre-rolled some 3 seconds before. If this time delay problem is not enough, the picture and sound are not in synchronization due to what is called a frame store. Provided only one frame store is used, the picture to sound delay is usually okay, but more than one frame store can be used in series and the sound of a tennis player hitting the ball can become delayed enough for viewers to ring in and complain. Any way I'm getting off the point of rigging the links.

By the way the tennis venue is line of site to the ABC studios and all the other commercial TV stations, provided you are on the roof, some 30 metres high of the Superdome. This is often not the situation and all links have to go via a microwave repeater set up just for the event, a big enough task in itself. This at least made the job easier.

The next job, and it is now lunch time and the first tennis match starts at 4 PM, was to rig 3 sets of links at a commercial television station (CH9 Perth) for the International link feeds. I forgot to mention there are two tennis feeds, one for domestic and one for International. The commercial television station has the international satellite link required, so 3 links are rigged from the tennis OB site to CH9. At least the tennis international links at the tennis OB site had been able to be pre-rigged a few days before, as they were not needed for the millenium concert. Why 3 links if there is only one international tennis feed? After all this is just two people hitting a ball back and forth. The reason is failure redundancy. Have you ever wondered why television stations are able to bring you sporting OBs from all over the country for days on end without the microwave links failing? And trust me they do fail. The reason is redundancy. For any major live OB two links are required, both running. In practice 3 links are required just to be extra safe for OBs like the Hopman cup.

Have you ever wondered why television stations are able to bring you sporting OBs from all over the country for days on end without the microwave links failing? And trust me they do fail. The reason is redundancy.

Needless to say rigging at the CH9 50M (160 feet) tower took 3 times longer than thought. One of the problems was one of the 13 GHz links from the tennis to CH9 did not go. After much panning and tilting of the 1.2 metre dish the second 13 GHz link was to be looked at when times allowed, as time had run out. At least we had one 13 GHz and one 2.5 GHz link for the international feed from the tennis to CH9. With an hour to go there was only one link from the tennis to the ABC for the domestic program. Our next job back at the tennis OB site was to rig the remaining links, 2 backup program feeds and 2 reverse feeds for monitoring. Staff had to leave other jobs and make a start on the link rigging at the OB site as we could not make it in time from the CH9 site to the tennis site.

We went to air with a bare minimum of links for you the viewer to be able to enjoy the tennis, completely unaware of the effort required. This was an unusual situation due to the previous OB requirement the night before and normally most of the links are up and running for a major OB like this, several days in advance.

One other point, there are differences between program sources such as a tennis match, requiring more link paths. For example the international feed often has no commentary, just crowd effects. There is no point in sending English commentary to a non speaking English country. The commentary is mixed into the crowd effects at the destination country in the local language. This different audio requires its own link. If this is not enough there can be network complications. During the tennis the afternoon matches may go pass 4PM Perth times and this is 7PM Eastern summer time, ABC news time. The tennis feed to the Eastern States has to have an out closing sequence that is not seen in Perth, as the telecast of the match carries on for Perth viewers. Different link feeds for the two different programs for that time, are required.

All in all outside broadcasts like tennis, golf, football etc are much more complex than 20 years ago. The amount of equipment, much of which is sent interstate from other television stations, in staggering For example why 24 video tape machines at a tennis OB? Well all the replays come from video tape. Slow motion replays are replayed from tape. Also many cameras are iso (isolated) recorded for that "lets have another look at that from a different angle." Also edited highlight you see on the news or highlight packages have to but together and edited on tape The end result, there is never enough tape machines to go round, and there are always a few not working properly.

Well this has been a brief description of a television outside broadcast. Looks so easy sitting back and watching the finished product at home, but the time, effort and equipment required is mind blowing. Hopefully some time for amateur radio now, or just a long rest as writing about it has left me exhausted.

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SILENT KEY

James Rumble VK6RU (1917 - 1999)

It is with deep regret that I have to advise that Jim Rumble VK6RU became a Silent Key on the 21st December 1999.

At the age of 10, as a member of the Subiaco Boy Scouts, Jim first became interested in communications, where he learnt the morse code when communication then was with Aldis lamps.

Leaving school in 1936 he first worked for a land and estate agent but in 1937 he joined his father in the family pharmaceutical business E. Rumble and Co.

However, it was back in 1933 that he first joined the Subiaco Radio Society in the days when Bert Congdon VK6BC was the Secretary. Jim studied for his license through that Society and attended classes run for the WIA by Malcolm Murray VK6MY. November 1937 was the date he obtained his license and the callsign VK6RU that he held continuously until his death.

His first receiver was an OV1; a home built TRF receiver with type 57 and 58 tubes. The transmitter also home constructed with plug in coils and using 6A6 and 807 tubes, was first put to air on CW from the QTH in Subiaco of Ron Hugo (the late VK6KW).

Just before the war Jim joined the WIA when Clarry Cook was the QSL Officer, and in June 1939 took over that position which he held continuously until September 1999. When transmissions were forcibly stopped in Sept 1939 Jim had received many QSL cards with confirmation from 57 countries.

World War 2 caught up with him and he joined the army (at the same time as Ron Hugo) and was first posted as a Wireless Mechanic in the Ordinance Workshops at Bushmead (near Guildford). The late Jack Squires VK6JS was the permanent C/O. Transferred to service in the Pacific, he was posted to RAEME in Bouganville and promoted to Officer rank as a Lieutenant. Various army schools were attended and he was even seconded for some time as a diagnostic troubleshooter with a US Navy radio unit. When the war ended he was in Townsville and was finally demobbed on 24th December 1945. Immediately he resumed his amateur activities.

I personally first met Jim in 1949 when I was studying for my AOCP where Jim ran the morse class and Ron Hugo was the theory instructor at the Radio Society of Western Australia (formerly the Subiaco Radio Society). Jim became a DX hound in earnest and had worked 300 confirmed countries by 1948. However the total countries finally worked was 485 and all 485 QSL cards were on the wall of his shack. Postwar he missed out on only three countries - Damien Diu (an Indian State), Portuguese Goa and one other independent African State. One of the three missed only ever made five QSO's and unfortunately, although Jim heard this station, he missed this contact. Only four operators in the world have all these countries, one of who was Jim's friend the late W8GZ.

In the 1950's and 1960's 6RU was in most DX competitions that were held. His most prized certificate was the Golden Jubilee DXCC for which you had to obtain DXCC in one month as a deliberate operation, NOT a contest operation. Jim did this between 1st to 31st Jan 1987 and was the only one in Australia to achieve this certificate. Another achievement was DXCC on three bands in one contest (10, 15 and 20 metre DXCC in one weekend)

Jim traveled extensively and met many of his worldwide contacts from his collection of over 100,000 QSL cards. The most prized card he had was from JY1 - King Hussein of Jordan, worked in Nov 1970

The equipment he finally used was a Collins KWM2A transceiver (previously he had a Collins 32S1) with a Collins 30L1 linear amplifier which had four 572B tubes in the final. Antennas used were a 4-element monoband Yagi on 20 metres and above this a separate duoband radiator for 15 and 10 with separate reflectors and directors.

VK6RU was one of the stalwarts of Amateur Radio in Western Australia; a life member of the VK6 Division of the WIA and did much to advance the organisation and encourage and help new and young members to the hobby.

All members of the Institute and his many contacts worldwide are deeply saddened by his passing and send sincere condolences to Jim's three sons and their families.

Vale Jim Rumble - VK6 Radio United.

Tony Savory VK6TS
VK6 Councilor and Broadcast Officer

Ron Wills ZL2TT

It is with great sadness that I advise all Contesters of the death of Ron Wills ZL2TT.

Ron would have been quite well known to many of us in VK, through his strong interest and participation in Amateur Radio in general and contesting in particular.

Ron was diagnosed with a terminal illness around Christmas/New Year and given only two months to live. Sadly, he died in early February.

Ron was an active supporter of NZART, being Contest Co-ordinator for the last eighteen months or so. In this context, and through contest QSOs, I came to know Ron as a dedicated but always fair and helpful contestant. We shared a good rapport in keeping each other up to date with what was happening in our part of the world, as regards contests.

I shall miss him very much, as will his colleagues in NZ amateur radio.

Vale, Ron ZL2TT

Submitted by Ian Godsil VK3DID, WIA Federal Contests Co-ordinator.

James Robert Walker VK2AJT

Jim passed away on 27th December 1999 after an illness of several years; he was buried at Nowra on the last day of 1999.

Jim spent 51 years in PMG/Telecom including 4 years of War Service. He retired in 1988 on the eve of his 65th birthday. As an Amateur he was a very resourceful and skilled constructor. He had many projects to his credit, from audio through to 433MHz, CW, SSB, RTTY and finally satellites. His last completed project being a real time computer controlled satellite tracking 2m/70cm antenna system.

To Jim's family and friends we extend our condolences.

John VK2BHO. 5 Jan 2000
John Hodkinson, Warilla, NSW
30 November 1999

The WIA also regrets to announce the recent passing of:-

(LEO) McGARRIGLE VK4CXR
D S ROBERTSON VK5RN
G J DINEEN VK7DF
D A (Denis) BAILEY VK2NVN
(Harold) HEPBURN VK3AFQ
L (Len) VERMEULEN VK3COD
C W (Cec) PURVIS VK3DEN
M R (Snow) CAMPBELL VK3MR

PSK31 *the easy way*

Alan J Gibbs, VK6PG

This paper outlines the concept of PSK31, proposed by Peter Martinez, G3PLX, and suggests an easy approach to constructing a simple interface between an Amateur Radio transceiver and the average home computer. A general overview of PSK software is covered from installation and operation of this new mode of communicating on the HF bands.

The future of PSK is also discussed, and conclusions suggest that new innovations in transceiver design, together with the possibility of multi-tone dedicated PSK modems being introduced into the Amateur Radio marketplace early in the New Millennium.

The need for a new AR communications system that is more efficient in spectrum occupancy has become vital for the continued expansion of the AR service.

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File: D:\MyFiles\psk paper.doc

1. The Introduction

The average home computer is now well established in the Amateur Radio (AR) fraternity where assertive operators have devised easier ways of operating their equipment. Packet radio, RTTY, Logging and Control software now offer innovative ideas to keep track of information, and even turn the big beam antenna to coincide with the bearing of an entered callsign. DX tracking via Wormhole clusters, packet BBS nodes, and a massive increase in the use of the Internet has provided AR resources and research information, each uniquely leading to an explosion of information interchange enhancing the enjoyment of AR worldwide.

It has been many years since any "new modes" have been introduced. The more traditional CW, SSB, RTTY and specialised error detecting data modes, like Amtor (G3PLX), Pactor and Clover, have each added to the myriad of unusual "chirping" signals now heard on the international short wave AR bands.

However, with an increasing demand on the HF spectrum, and considering that most of the current modes of AR operation with the exception of CW are "spectrum hungry", the need for a new AR communications system that is more efficient in spectrum occupancy has become vital for the continued expansion of the AR service.

Based on an idea by SP9VRC and developed by Peter Martinez, G3PLX (1) a new Amateur Mode called PSK31 is emerging. Instead of keying using Frequency Shift, FSK, this mode uses Phase Shift Keying, PSK. It uses an alphabet similar to Morse, which gives a text speed of about 50-wpm. Our experience to date shows that even without an error-correcting algorithm, copy is as good as any and better than most at low signal levels. It is a particularly attractive mode since it requires no lock condition or handshaking with a second radio station, and roundtable QSO's with more than two stations can be enjoyed (6).

Early experiments involved the use of a specialised PSK modem (4). Later, assertive AR operators wrote dedicated PSK computer programs (1) that exploited the digital sound conversion (DSP-CODEC) qualities of the average 16-bit computer sound card instead of acquiring an expensive and customised PSK modem. This concept, together with "freeware" PSK computer programs (7) has lead to a rapid worldwide expansion of PSK operation on the AR HF bands.

Already, the ARRL have approved claims for the first "All PSK" DXCC, and the British Amateur Radio Teledata Group (BARTG) have issued their first certificates to PSK operators, with 40 confirmed countries worked (4), in commemoration the 40th Anniversary of the BARTG. Even WAC using PSK is easily achievable in just one weekend of operation!

Today, 14Mhz is brisk with PSK traffic from all parts of the globe. Operators keyboard chat to each other in a similar manner to the more traditional RTTY contacts but with a considerably reduced bandwidth and enhanced signal to noise ratio. In fact, the bandwidth of PSK is narrower than keyed CW (1) and up to 60 PSK stations can operate within the usual spectrum occupied by a single SSB station. With all this in mind, PSK is well worth a look at by AR operators with a computer in their shack, and about one evening's work constructing a tiny interface from "junk box parts" connected between the transceiver and the computer.

2. Some Basic Theory

Peter Martinez, G3PLX (1) scanned normal text and compared the character usage with ASCII code for frequently used letters. A new binary code was then developed based upon his findings. From just 10 bits if binary code, all 128 ASCII characters were represented. Later, Peter extended this new code to include other accented characters for potential users in other countries. Naming the new code – *Varicode*, Peter established that with English text, Varicode had an average code length, including the '00'-letter gap, of 6.5 bits per character. By simulating random bit errors and counting the number of corrupted characters, Peter found that Varicode is 50% better than start-stop code (Eg. RTTY) and verified that its self-synchronising properties worked very well.

When idle, Varicode sends a continuous string of zeros, just like the "diddle" used in RTTY message gaps, and using a reasonable typing speed of 50 words per minute, requires a bit rate of 32 per second. 31.25 was chosen because it is easily derived from the 8kHz sample rate used by many DSP systems. To make things easier, the bit rate was rounded off to 31 and the new mode became known as PSK31. It works by using phase shift keying, but instead of keying the carrier on and off which is wasteful, Peter shifts the phase of the carrier by 180 degrees. The polarity of the carrier is changed, and when "shifted" in this way the resulting Varicode becomes BPSK or Binary Phase Shift Keying. Demodulation of BPSK starts with a narrow bandpass filter of 62.5 Hz at the 50dB-down points. When at idle, the 31.25 BPSK signal offers receive synchronisation making the process reliable at normal text rate (1).

The new PSK31 signal now comprises a very narrow, PSK signal at 31.25 bauds, about 50 words per minute and slightly slower than the more common RTTY signal running at 50 bauds or 66 words per minute. The "self synchronising" properties of PSK31, and its ability to occupy only a small bandwidth means that the receiving station can considerably reduce the receiver bandwidth hence improve the receive path signal to noise ratio (SNR). All this means lower transmit power, less interference to other users, more stations can be accommodated in the narrow allocations to the AR service, and better chances of working long haul DX in a busy part of the band. And lastly, the addition of a very exciting new mode of communications for Radio Amateurs around the world.

3. The System Requirements

The Internet now offers a large number of "freeware" PSK31 computer programs (9) including DOS based programs suitable for the older Intel 286 systems, through to higher level Window 95/98/00 32 bit operating systems running on faster Pentium III class machines.

Assuming you have a just humble, recycled Intel 486-DX2, 50mHz computer (just like the writer!), with a minimum of

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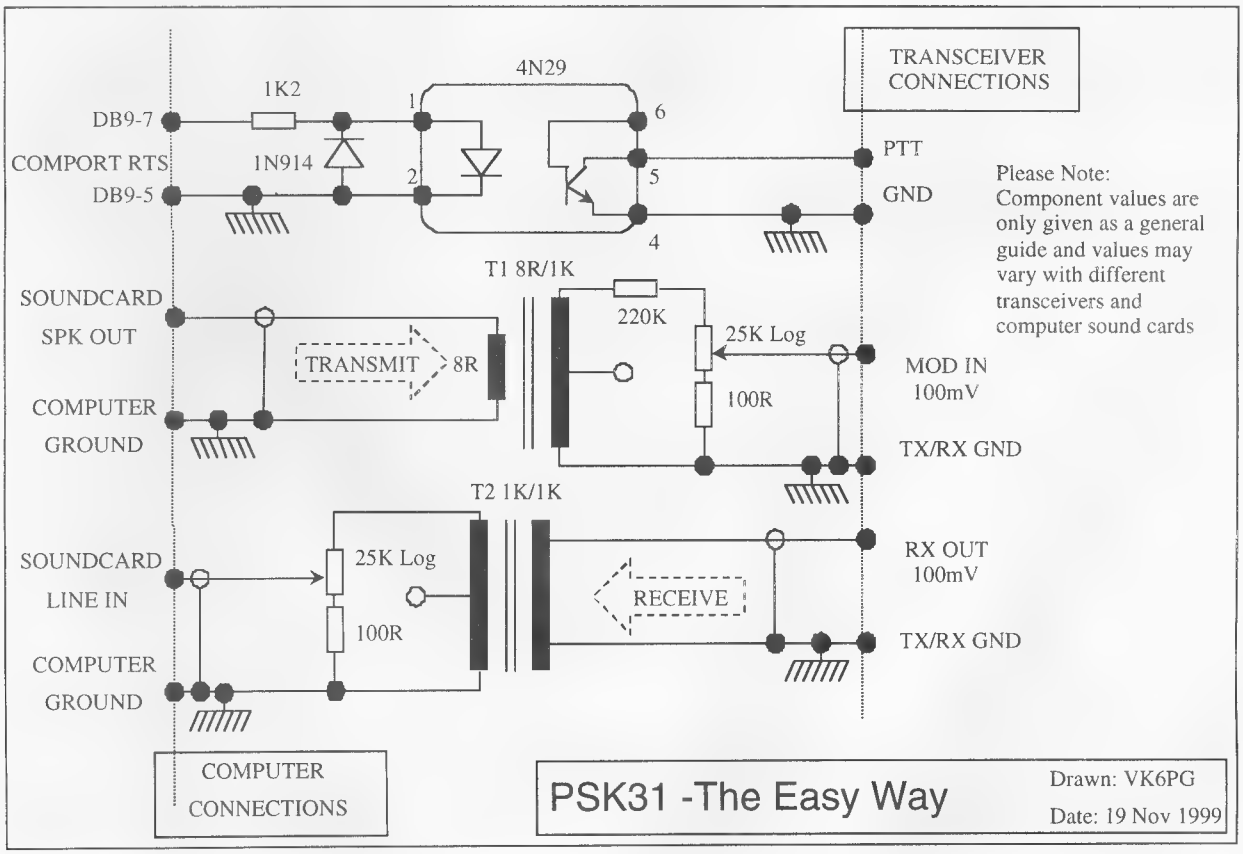

Figure 1: the interface box

continued from previous page

16 megabytes of RAM, a floppy disk drive, a good quality 16 bit sound card such as a SoundBlaster 16, and a spare communications (RS232) port – then you are in business. Windows 95, update 3 will work well on these machines provided you have a "clean system" with plenty of hard drive space available to experiment with different PSK and logging software when running your station.

4. Building the Interface Box

Linking the computer to your transceiver is the easy part, and an opportunity for you to do a little "home brew" in the process. For readers that just want to "try before you buy", just connect the loudspeaker output from your transceiver to the line input of your sound card. Run your installed Windows sound mixer and select "Line In". Run the software described in part 5 below and tune around 14.070 listening for a "warbling" sound. Vary the tuning to give an audible output of about 1kHz and you should see words appearing in the middle of the PSK software window. That's it!

So, once you have listened, and watched the PSK31 QSO's "warbling" around the world, and you've decided that you'd like to have a go, then turn to the back page of this paper for a detailed circuit diagram of how to build the interface box.

The interface box uses two transformers for DC isolation between your computer and the transceiver.

Two potentiometers allow optimisation adjustments of transmit and receive levels. Fixed resistors "pad" the circuitry to prevent transmit overdrive and receive soundcard distortion. The PTT circuit comes from WM2U, and offers excellent snappy PTT control with the advantage of total opto-isolation between the computer communications port and your transceiver. These techniques give you satisfaction that if any "funny business" happens between the computer and transceiver, then nothing will be damaged.

Do be prepared to make changes to the circuit to allow for the equipment variations used in your own shack. Perhaps you are lacking a line input and line output socket on your transceiver. In these circumstances the microphone-input socket might have to be used instead. In this case the input to the microphone socket must have an attenuator with a 100:1 gain reduction to avoid overdrive on transmit. If one of the pots seems to only work when stuck on one end of the rotation, then add/remove/change the values to give the correct levels in the center of the potentiometer. Once this is done, no further adjustments are needed.

The writer used a normal "plastic style" box, and carried the screened cables through into the box. Remember to use log pots, which can be pre-sets or panel mounted with shiny knobs for later twiddling and fine-tuning. On the rear of the box, the writer fixed a recessed DB9 connector, that can be connected to the computer comport with a standard DB9/DB25 data cable. A small 3.5mm jack socket was used for the sound in, and the sound out used an "RCA" phono socket to avoid accidental cable interchange when "grubbing" around the rear panels of the equipment. The writer has not experienced any problems with RF breakthrough interference, but should this happen in your case, try a few ferrite beads on all input and output leads. Rest easy in the knowledge that you don't have to build power supplies for this little box! The opto-isolator is powered from the computer RTS line at the comport output.

5. The "Freeware" Software

Peter Martinez, G3PLX (2) designed a very simple PSK31 software package (shown in Figure 2) that provides all the features needed in an operational AR station. To

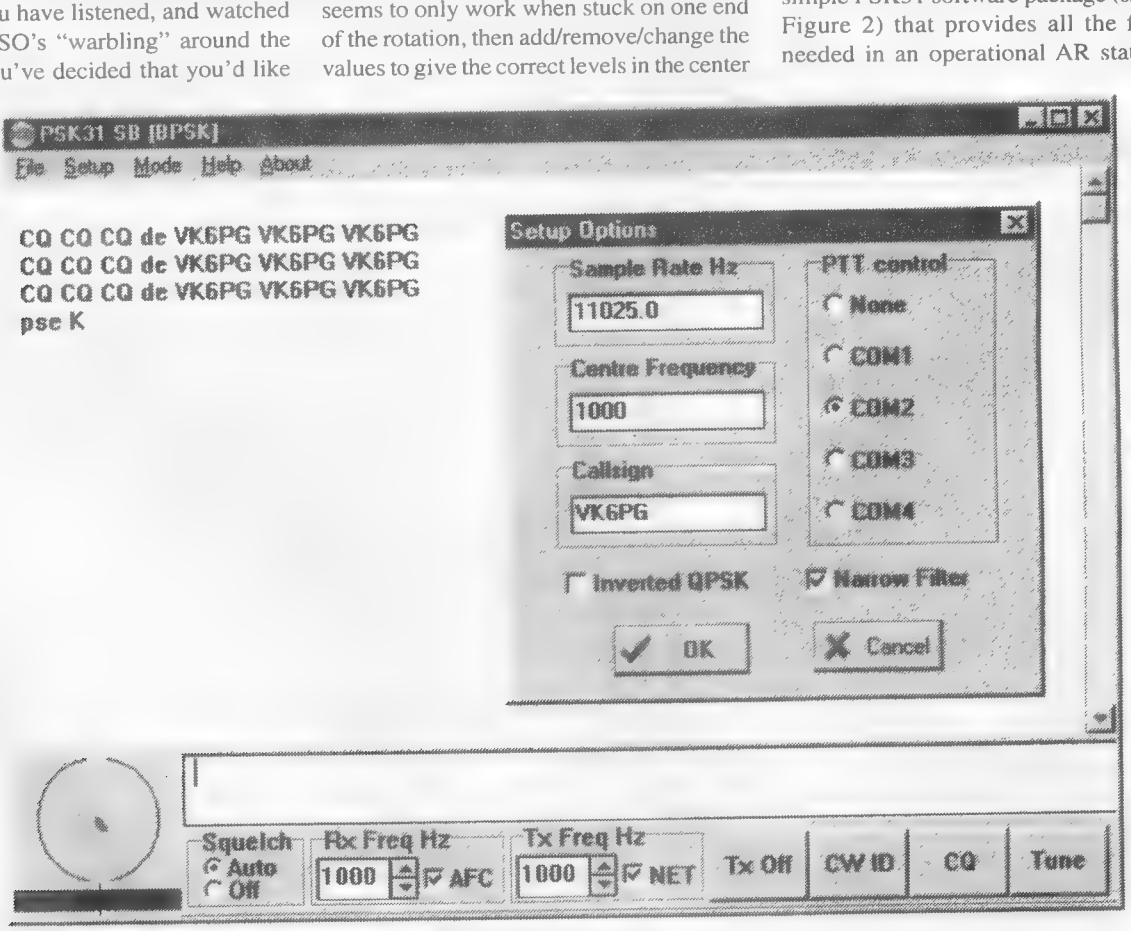

Figure 2: "freeware" software

further promote experimentation of PSK31, Peter has offered the software free-of-charge ("Freeware") to licensed AR operators. Windows 95/98/00 compatible software is freely available on the Internet (9), in compressed format, with the filename – *p31sbw108.zip (179k).* Simply install this file in a new folder called PSK, Unzip the file using WinZip and place all the files together in the one PSK folder. Place a PSK shortcut pointing to the file – *psk31sbw.exe* on your desktop and you are ready to open the program and run the setup.

From the screen view shown, select the Setup menu to open the Setup Options dialogue box. Enter the sample rate at 11025.0 Hz, Centre Frequency at 1000, your own callsign, and the comport number for PTT access. Check the Narrow Filter radio button and close the box by "clicking" OK.

If you have a 16 bit sound card correctly installed on the computer and taken the mute off your loudspeakers then try "clicking" the CQ button. Your customised CQ will be heard in the speakers, the Phase Scope will display a green vertical line, and you should hear the characteristic "warble" of BPSK keying in the computer speakers. The large upper window will display each character when keyed by the software shown above. On completion, PSKSBW zero idles then automatically sends your callsign as a CW ident to complete your first "test transmission".

Selecting Tune will place the software into idle with a PSK31 signal ready to feed into your transceiver. TX Off simply drops the keyed tone and signals the comport to release your PTT line dropping your transceiver to receive mode. If your tests have been successful thus far, you are now ready to connect the transceiver audio output to the soundcard line input to receive live PSK31 signals off air.

Remember that PSK31 is experimental, and most authors have their own opinions to setting up individual stations. The following extract by WM2U reviews some overall tips and hints:

The simplest and quickest computer to radio interface is to connect the Line Output from the Sound Card to the transceiver audio input with a 100:1 voltage divider to reduce the voltage output, and the Sound Card Line Input to the audio output of the radio. You can use the VOX to switch from Receive to Transmit. To setup this arrangement, adjust the sound card output level using the computer 'mixer' control until maximum transmit power is reached, and the ALC is just starting to read. Then tune to a strong carrier and adjust the soundcard-input gain until the red line goes away as observed on the spectrum display. (Waterfall indicator) This procedure is covered in great detail in the PSK31 Help files under "setting up the sound card" (6.)

WM2U's Hints List:

1. Set sound card sampling rate to 8000Hz
   This must be at least a 16 bit sound card.
2. No Signal observed? Check WAVE slider is not zero.
3. Set Rx and Tx frequencies to 1000Hz.
   NOTE: This value will get you up and running but if you plan on using a filter change it to the center frequency.
4. If using LSB check the "Inverted QPSK" .
5. Too much noise! Use a narrow CW filter.
6. Using a Word Processor, write your buffered messages and save them as .txt files, placing em! in a folder called 'buffers' created in the main PSK31 folder.
   NOTE: This is NOT a form of type ahead buffer. It is simply a method to pre write 'Standard' messages hence saving you keyboarding time.
7. **READ THE HELP FILES.**
8. Your sound card output must NOT overdrive your Mic Input.
9. Do not overdrive the sound card input from the Radio.
10. Get used to the Waterfall/Phase indicators for tuning.
11. Do not use your Speech Processor.
12. Be patient. This is a new mode. You will not find all the features you are used to yet!

Table 1: Hints list

6. On the Air with PSK31

With the interface connected, and your transceiver connected to a dummy load, select the Tune button to activate the PTT line and send the PSK31 tone to your transceiver input. Turn down the transceiver microphone gain or disconnect the microphone altogether to avoid acoustic interference to the PSK31 signal. With audio compression switched off, adjust the power output to well below the ALC threshold and measure the output power of the transceiver. A good setting will be say 80 watts output from a 100 watt rated transmitter. This setting will ensure you are not overdriving the transmitter to a point where the transmit intermodulation products (IMD) are poor. This will give you a linear output with IMD figures in excess of 25dB or better.

Check that received PSK31 signals are clearly readable, and that the phase tuning indicator changes to yellow on received signals. When the tuning is "rocked' from side to side, PSK signals can be seen to move horizontally inside the Waterfall display below the phase scope loop. Signals will show up as pairs of white dots crawling slowly down the Waterfall, and fine-tuning allows centring the white dots on the graticule below the loop in the middle of the Waterfall. It takes a little practice but your time will be well spent if you learn how to receive PSK31 signals *before* you start transmitting them. If your received level is too high into the sound card, horizontal red lines with suddenly appear in the waterfall. If this happens reduce the receive level pot at your interface to avoid overload.

Note that on a received signal, the software automatically "Nets" with the incoming signal and the RX Freq Hz display may change to say 885 Hz. Leave the RX Freq Hz AFC box ticked, and the TX Freq Hz at Net to allow the software to "track" and "net" with stations that you wish to communicate with. Next, try re-entering 1000 Hz to both boxes, move the tuning so that a PSK31 signal is heard and within the Waterfall but clear of the graticule. Move the mouse onto the white PSK spots in the waterfall and "click" the mouse. The software will "autotrack" the wanted signal in phase, in the graticule, and will display the receive text in the large upper window.

The waterfall displays about 250 Hz high and low from the optimised 1000 Hz

continued next page

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setting, this gives a visual display of channel activity, interference problems, tuning accuracy and a time display that slowly ripples down the window. A very useful device once you get used to its unusual characteristics.

Lastly, try typing on your computer keyboard. The first character automatically switches the transceiver to transmit, sends a preamble of "00's" and starts the transmission process. To return back to receive, just "click" the TX Off button. Once all this works to your satisfaction, signals can be simply resolved, and your transmissions are "clean and tidy". Now comes your chance to find some DX and have fun with PSK31.

To streamline some of your own activities, try opening the Windows Notepad text editor and type in your own customised CQ file. Save the file as say *cq_psk.txt* and place the file in your PSK folder. Try another file for your "Rig Info", another for your "Personal Info" and another for ... "Thanks for the contact. My QSL is fine via the Buro. 73's de (Callsign) SK" with one hard return at the end of the message. When you try selecting File, Send File, the dialogue box opens your PSK folder and lists all the saved **.txt** files ready for selection. "Double click" your choice and PSKSBW automatically sends the file for you. To abort at any time just "click" the Abort button and resume your chatting on the keyboard.

Once a file is being transmitted, you can "click" on the CW ID button at any time. Once the file has been completed, PSKSBW will send your CW ID and drop back to receive automatically. This is a nice feature for contests and snappy DX operating on the HF bands.

The main International-calling frequencies suggested by the RSGB (6) are:

3780.150 7035.150 14.070.150
21080.150 and 28080.150

Other WARC band allocations are currently being negotiated with other mode users. However, the following frequencies should be also tried:

3595.150 7037,150 10142.150
14.072.150 18102.150
21082.150 24082.150 and
28120.150

Good luck and fine DXing.

Once you have enjoyed your first PSK31 experiences, the time will soon come when you feel the need to improve your receive capabilities by adding audio DSP filters to minimise white noise and include additional narrow transceiver receive filters. Just like any other mode, PSK31 is still vulnerable to adjacent channel interference. Tuning has to be very precise, and within a few Hertz to capture signal acquisition successfully.

The writer uses an Icom IC756 transceiver with a Timewave DSP9 to minimise noise and gain some degree of digital filtering. The IF bandwidth on the IC756 is reduced by operating the radio passband controls to prevent adjacent channel QRM from desensitising the receiver when trying to read PSK signals. It's rather like visualising the channel, and making adjustments according to band conditions at the time.

One writer (8) suggests that all these techniques are valid, including fitting a narrow CW filter and programming the receiver to "think" that it has an SSB filter in the IF chain. To do this, the PSK tone has to be shifted to 1200 Hz placing further demands on other devices like the audio DSP device. These are all techniques currently being explored to enhance the already exceptional qualities of PSK31.

The future of PSK looks very bight indeed ...

7. The Future of PSK

New developments in PSK (4 & 5) operations include digital, multi-channel telephony with 60 simultaneous PSK signals all within the spectral occupancy of existing SSB transmissions. Military users have been well practiced in the use of PSK for a number of years now, and the mode is well equipped with encryption technology for national security and commercial confidentiality. Specialised PSK development kits (2. Motorola DSP56002EVM by G3PLX) can be used in AR communications, and in digital telephone and satellite applications. Even the principles of the forthcoming digital television systems rely on PSK for minimising spectrum occupancy.

However, the simple concept of BPSK suggested in this paper is just the dawning of developments to come. Being a part of this euphoria is exciting and fun, yet economic to the average Radio Amateur who just likes to "fiddle" with new things or just aims for a DXCC on PSK31! AR commercial equipment designers and developers have yet to include PSK options with their equipment. But if they start thinking harder on how the digital programming options can be expanded to include these new mode configurations, then we are all in for an interesting New Millennium.

8. The Summary

This paper has been compiled because the writer would like to "give back" a little something to a hobby that has been much loved for almost half a century. This was earlier done with RTTY in the 70's, but with PSK the time is right to try conserve valuable spectrum space and to improve the resolution ability of communications for the benefit of all Radio Amateurs.

Why don't you give it a try?

The writer would like to commend the contributors listed in the reference section of this paper. They not only have demonstrated their own skills and prepared to share them with other AR operators, but also taken the time to write about their findings that we can all learn from their experiences.

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VHF UHF AN EXPANDING WORLD

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Phone 0414 808060 (before 2130 EST please)

All times are UTC

6 metres is alive and well!!!

I thought we would get a rest from F2/TE. Wrong!

Neville Mattick, VK2QF, Hargraves, NSW, provides the following summary of 6 Metre Contacts for Dec 1999 through till the end of Jan 2000

13/12/99, YN1SW [SSB] 2346z, YN1SW 2344 [CW] 100 deg 599, K6MYC [Hrd] 2330z, ZL3JT 2313z, ZL4WA 2306z, XE1BEF [Hrd] 2211~2337z, XE2UZL/B & XE1KK/B 2203z.

14/12/99 TI2KI, TI5BX 2342~2344z 110deg to S9, XE2EED 0156z, 3F3XUG 0130z, WB6AAG 0126z, HP2CWB 0119z, K6QXY [Hrd 0116], WB6AAG 0108z, HP2CWB 0103z, TI2NA/B 0051-0129z, TI5BX, 0031z, TI2ALF 0029z, TI2KI 0027z, TI2RPT 0026z, TI5KD 0024z, TI7WA/4 0022z [CW] 110 deg mostly S9, N5JHV [Hrd] 0008z,

27/12/99 P29KFS 0903z 360deg 5x3, 27th** P29KFS 0903z 360deg 5x3, 15th December HL5XF & JA's heard from 0220z, TI2KI 0014z [running 2 watts] 110deg 5x5!,

8/1/00 3D2AG/R 0219z 65deg 5x5.

10/1/00 HP3XUG 0030 106deg 559,

20/1/00 P29KFS 0301z 360 Deg 5x9, P29BPL/B 0827z 360 Deg,

24/1/00 JA2,4,5,6 0815z 330 deg to 599,

27/1/00 JA 0,1,2 330deg to 599,

29/1/00 XE1KK/B from 2327z, XE1/SM0OUG 2323z 90 deg 559, JA Beacons 0236~0411z, TI5BX 0208z, TI5KD 0203z [Hrd only], W1LP/MM 0206&0158z, TI7WA/4 0150z, HP3XUG [Hrd only 0042~0105z], FO5DR/b 0054~0307z 96deg to 599,

30/1/00 XE1BEF [Hrd] 2336z, XE1KK/B 2331z, FO5DR/b 0013~0227z, FO5DR 0121 & 0131z 100deg 599, W1LP/MM [EK51] 0116z 90deg 5X9, XE1UN [Hrd], HR1RMG 0044z 95deg

31/1/00 AH6MIO/KH6 0403z 45deg 5x9, XE1BEF [Hrd QRZ-CW] 0031z

The contact to HR1RMG is possibly a HR~VK first as well as the Nicaragua YN1SW also being a possible YN-VK first. Neville writes ... *"My feeling is that Sporadic E has mainly contributed to the unprecedented volume of Trans Pacific contacts for Dec\Jan. Mainly evidenced by the strong direct ZL 45\55 video and a number of 40MHz local indicators that are associated with E layer. It [the E propagation] has given us access to the TEP out in the Pacific, rare is the time that for example I hear a ZL working Central America and also work the Central American. Sort of a global opening at times."*

"As the E drifts in all the locals out at 1500+ km become audible too, then the longer paths fail! Interesting stuff and February could be interesting not mention March \ April, shades of 1989 again." ... Neville VK2QF

Wayne VK6JR, Perth, WA, reports ... *"The season started late and was very poor over the Christmas period. January had a number of openings with long skip zones and weakish signals. Amateur signals were heard or worked on 20 days during December and January with a total of 32 DX stations worked, some from the mobile. VK and/or ZL TV were heard on more than half the days.*

Best DX days were the 16/12, 17/1, 30/1." .. VK6JR

John, VK4FNQ, Charters Towers, QLD reports an opening to Hawaii (KH6) 8/2/00 with the following heard 0615Z 50.064 MHz KH6HI BCN 529, 0618Z 50.061 MHz KH6HME BCN 519, 0626Z 50.110 MHz KH6SX HRD 41. Open to JA from 1000Z. On 14/2/00 0246 50.110 WA7JTM HRD 55, 0305 50.135 W5UWB HRD 31, 0309 50.110 VK8MS CQ 55, 0630 50.028 XE2UZL BCN 539, 0630 50.061 KH6HME BCN 529, 0630 50.064 KH6HI BCN 419, 0646 50.110 KH6SX CQ 419. (That XE2 station is rather late in the opening, see VK4BRG's comments below also)

Ron Graham, VK4BRG, Sarina, QLD, also reports on the openings from late Jan to Feb 2000 ... *"A good long lasting 6m opening from Central Qld. to the area around Panama..*

Monday 27th *0015 W1LP/MM 5-5 5-5 Clint in FJ09 (near nth. entrance of Panama Canal 0027 HP3XUG 5-7 given 5-9 rec. EJ88, 0038 TI5KD 5-9 5-9 EJ79, 0057 W1LP/MM 5-9 5-9, 0057 to 0144 W1LP and HP3XUG heard from time to time calling/working VK stations. W1LP commenting that this was the longest opening he had ever experienced considering the distance involved! 0200 copied W1LP working VK4LE"*

Further on 14/2/00 ... *"An interesting 6m opening to southern US states, essentially S. California to Texas .. commenced, for me, at 0146 UTC on 14th .. worked 12 stations by 0255 .. thought band had closed, so had a sched on 20 metres + lunch .. noticed band open .. worked another group of 11 stations till 0403 UTC."*

"This is late for a US opening, but back

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in shack at 0542 and worked, as did some other VK4's, N6XQ. So, I would venture to say, the latest opening ever between VK and the US mainland. One XE worked, but he is close to S. California. The real odd one was W7HAH in Montana" ... VK4BRG

Tony VK3CAT, Melbourne, VIC, reports ... *"Sunday morning, 30.1.2000 @ 0123, worked XE1J on 6 metres. XE1J was heard working many VK3s in the Melbourne area as well as to the East and West of the state. Es also present to VK4 and VK2 as well as ZL TV."*

From New Zealand Mike Frobisher, ZL3TIC reports.. *"On 14/02/00 during the large Stateside opening @ 2130 ZL4AAA worked EH8BPX 50.110 distance 18.900 km!!"* ... ZL3TIC.

New Zealand stations reported (in general) excellent conditions to USA/ Central America on both 13/2/00 and 14/2/ 00

David Vitek has sent in a comprehensive list of band conditions over the November to January 2000 period from Adelaide. No recorded openings, to VK5, have occurred to the America's or Europe in this time. The most substantial DX being JA on 26/11, 27/ 11, 28/11, 29/11, 30/11 and 4/12. Then there is a gap in JA openings till 8/1, 9/1, 25/1 and 31/1. Other log entries include Oceania DX, Asian TV etc. David has logged every opening and the various paths, from VK5 on 6 metres over this period. It makes fascinating reading and has helped give background on the role Sporadic E has played in enhancing F2 this year into other areas around Australia.

Should anyone, studying propagation, like a copy of this log, please let me know and I will forward a copy. Thanks again, David

Finally Scott VK4JSR reports hearing the "new" VK4RTL beacon on 50.087MHz MCW on 31/1/00. Can any one else confirm this frequency???

144 MHz and ABOVE ... TROPO!!!

Whether it has been a good or poor Tropo season varies, as usual, where you are on the continent. As I write this on 15/2/00, if you live in VK5 or 6 it has been well below par in all directions. The VK2 & 3 areas have been a little more fortunate.

Guy Fletcher, VK2KU reports ... *"The Auckland (144.240) and Greymouth (144.286) beacons were audible for most of Friday and Saturday (local) at up to S6 until 1000Z on 5 Feb. No other beacons heard; is the Hamilton beacon (144.256) operational?"* Contacts as follows

3/2/00 2042Z 144.1 MHz ZL2TAL (54,56), 2050Z 432.1 ZL2TAL (51,51) - new square! 2115Z 144.1 ZL2VAL (56,56), 2132Z 144.1 ZL2TE (52,53)

4/2/00 2048Z 144.1 ZL3TY (56,55), 2137Z 144.12 ZL2VAL (52,51), 2324Z 144.2 ZL2TAL (31,53)

5/2/00 0621Z 144.1 ZL1IU (54,51) - only 25W at VK2KU

"As usual with ducts the New Plymouth stations were the first to appear. Bob ZL3TY in Greymouth had to be roused with a phone call when his beacon was S6!. Bob could almost certainly been worked on 70cm if he had an antenna to go with his rig." ... VK2KU

Gordon VK2ZAB reports ... *"The long awaited duct to ZL came up today (3/2/00). Beacons at Auckland [144.24 MHz] and Greymouth [144.286 MHz] were in all day. Stations worked from here on 3/2/00 were at 2037z ZL2TAL on 2m, 2049z ZL2TAL on 70cm, 2115z*

ZL2VAL on 2m, 2132z ZL2TE on 2m and on 4/2/00 at 0334z ZL1IU on 2m. Signal levels here were from S2 [ZL2TAL on 70cm] to S8 [ZL1IU on 2M]. Tried 23cm with ZL2TAL but no joy"

"The duct was maintained through Saturday (5/2/00) with Auckland and Greymouth beacons on 2m in all day. After much calling towards Greymouth without a response, Guy VK2KU 'phoned Bob ZL3TY who came up on 2m and after some difficulty with his transceiver was worked by Guy and then myself at 2146z 4/2/00. He was 5/3 and gave me 5/7."

"The few contacts to ZL were disappointing but there were a couple of interesting observations. The first was that stations in Christchurch and Dunedin heard Sydney pagers. Christchurch and Dunedin have been worked many times on 2m from here but always due to Sporadic Es. This was a duct and the first time in my experience that a duct has managed to transverse the mountain spine of the New Zealand south island. The second was that Bob VK2TG heard a weak 2m signal from FK1 on Saturday (5/2/00) evening. Same thing again — although New Caledonia has been worked on 2m from Sydney several times in the past it has always been due to Sporadic Es. Again this was a duct. First time this has been observed."

"On 8/2/00 Rej VK2MP worked Glen VK4TZL at Hervey Bay on 2m at good strength over the 1100 plus km path. There was Tropo at the time as indicated by the fact that Rej had previously worked Bill VK2ZCV at Pt. Macquarie which is an unusual event in itself." ... VK2ZAB

On 7/2/00 David VK5KK Worked Wally VK6WG Albany on 144.1 MHz @ 925Z 56-9 and 432.12 MHz @ 932Z 51-2. Phil VK5AKK also worked VK6WG on 144.1 MHz @ ~940Z, 59 and 432.12 MHz @ ~950Z, 56. Wally again worked by VK5KK at 1135Z on 144.100 56. VK6DM was also heard but not worked as far as I am aware. Signals also around on 8/2/00 from 2000Z – 2300Z with the Esperance 2m beacon on 144.567 MHz

On 8/2/00 Trevor VK3KEG at Somerville was heard working VK6AS at around 2255Z on 144 MHz. At 0040Z 144MHz SSB VK3WRE worked VK7ZPB, 0045Z 432 MHz SSB VK3WRE worked VK7ZPB, 0050Z 144.120 MHz SSB VK3KAI worked VK7ZPB 57/57, 0052Z 432.160 MHz SSB VK3KAI worked VK7ZPB 51/33, 0101Z 50.200 MHz SSB VK3KAI worked VK7ZPB 55/55.

On 9/2/00 VK3AFW wkd VK7XR 2113 144.080 MHz 5x8 5x8, 432.180 MHz 5x1 5x1 & 50.150 MHz 1x1 3x1. VK3CY, Wedderburn wkd VK7ZPB Flinders Is 144.150 MHz 5x6 5x6, VK3FIQ, Stawell wkd VK7ZPB

ALBANY Beacon heard in VK5!

I has been nearly two years since the beacon was last heard. Since then it has changed QTH and the propagation has been indifferent! During the opening of the 7/2/ 00 & 8/2/00 between VK5 & VK6, VK6WG's signal finally reached 59 levels ... a first this year. Phil VK5AKK went searching for the Albany beacon and found it 3.5 kHz low!

Please note that VK6RTW has QSY'ed (drifted?) to 144.560.5 MHz! Copied to 53 by both VK5AKK & VK5KK around 930Z 7/2/00. The current location is well shielded to the Eastern States according to Wally, VK6WG. No further news on the possible relocation. The Esperance beacon, on 144.567 MHz, is fully operational and has been heard during the last two openings.

MILDURA 2 Metre Beacon

Chas VK3BRZ reports on the Mildura Beacon ... *"Many of you may be unaware that Mildura has a 2m beacon in operation.*

Evidently it went on air some time last year, but the information got to John VK3KWA too late for inclusion in the 2000 Callbook."

The beacon's details are as follows:

Callsign: VK3RRU

Frequency: 144.434 (drifts down to 144.433 on a hot day)

Keying: FSK CW with mark freq. about 500 Hz higher than space freq.

Power/Ant: I believe it's 10W to an Omni (remind me, John!)

Keying sequence: VK3RRU QF15CS MILDURA (sent in about 16 seconds) followed by a silent period (i.e. no signal at all) of approx. 22 seconds.

"It is normally just at or just below the threshold of detection in the evening at my place (Lara, QF21FX). QSB frequently brings it up to S1-2 for short periods. During the day, I hear some quite strong but short-duration (a couple of minutes, typically) lifts up to S3-4 occur at rare intervals, consistent perhaps with aircraft-enhancement. Maybe an aircraft flying somewhat diagonally across the path."

"I don't know who is currently responsible for operating the beacon, but I hope they keep it going. It's great to regularly hear signals from up there. It was very useful in predicting propagation while Les VK3ZLS was in Mildura (and environs) recently. We worked on both 2m and 70cm from QF05, QF15, QF06 and QF16. Not a bad haul, particularly as Les was only running 25W and a 12-el yagi on 70cm. Amazingly, we exchanged 59+ reports both ways when he was in QF06, but signals lasted less than 5 minutes. Definitely aircraft enhancement." ... VK3BRZ

From my recollection, Glen VK3ZGL (now VK5ZGL after moving to Adelaide late in 1999) set up the Beacon sometime ago. The "stealth-mode" between idents makes it a little hard to find but I believe this keeps the duty cycle down on the Transmitter. The beacon can be heard anytime in most parts of Adelaide (~350km) and has some unusual peaks when we have over the land Highs (hasn't been too many of those this year!). As for activity, nothing has been heard this year on 144 MHz SSB, from Mildura.

Microwave activity in the LaTrobe Valley

Peter Freeman, VK3KAI writes ... *"There are only 2 of us active on microwaves locally in the LaTrobe Valley (QF31) (Ralph VK3WRE and myself) (plus a couple of others with 23cm FM handhelds). The nearest operators are in Melbourne or at Bairnsdale (QF32 - approx. 122 km away). Most of our activity is on SSB.*

I have had contact to QF32 (VK3EK at approx. 122km) from home on 13cm (2403MHz), as well as a few contacts back to the home square whilst playing Rover during the recent Summer Field Day contest, so I can now claim 5 squares worked on 13cm. Equipment used on this band is a G3WDG010 13cm transverter (from 144MHz) to H/B low level PA to VK5 PA kits (MGF0906 to MGF0907). Current power level about 4-5W out - should be able to increase this to about 10W by redesign of the low-level PA (3dB low at present). Antenna used on Field Day was a PayTV grid-pack style dish (approx. 80cm) with dipole/reflector feed. The same antenna is used on 23cm by changing the feed.

I have built the N1BWT 5.7GHz transverter and the Zack Lau 3.4GHz transverter, with some help from Ralph VK3WRE (my local microwave partner). We had a few initial problems with the 5.7 gear, but currently have about 5-6W out via a SS TWTA from Avantek (bought surplus from the UK a couple of years ago). I hope to increase the drive using another MMIC stage to get to 8mW drive, to give about 12W from the PA. On the Field Day Ralph and I had contacts to Mount Gambier (QF02) (VK5SR/p and VK5NC/p) on 5.7GHz - a distance of about 518km, after our first ever contacts over about 108km (VK3XPD/p and VK3KAB/p) - not a bad start to a new band! Antenna was an 800mm offset dish with horn feed which has not been optimised.

I currently have about 8mW on 3.4GHz, with the transverter barefoot. I have a California Microwave amp which needs a power supply to be built and then to be re-tuned onto the amateur band. I hope to get onto this task in the next couple of weeks. We worked 2 stations at 108km on the field day, again using an 800cm offset dish with a "coffee can" type feed. The kits for these bands are available from Mini-Kits and/or VK5 Equipment Supplies Committee.

So we have had a little success. Some of the other VK3 operators are starting to make noises about 5.7 and 2.4GHz. Barry VK3BJM and Mark VK3TLW currently have project for 5.7 "under construction". There are very few VK3 stations about at present on the bands between 23cm and 3cm. With the introduction of MDS television, we only have access 2400-2450MHz as secondary users. I wonder if other countries might increase their amateur activity at 2400 after Phase3D is launched - it might make some EME contacts much easier, as well as increase the number of people about in VK with 13cm?? (Our 2.4GHz gear is set up for satellite operation at 2400 with a 144 IF, and we use it at 2403 narrowband with 147 IF).

In addition, we continue to organise a weak-signal VHF/UHF/Microwave theme conference each July - our third one is at the start of the planning process now. This is our effort to promote activity and information sharing here in SE VK. I am currently editing/compiling the Proceedings volume for the 1999 event - a task I hope to complete in the next week or so. Proceedings from the 1998 conference are available at $15 in Australia (inc. P&P). More details on the Proceedings and of this year's conference soon - mark the dates in your diary now (July 8&9, 2000, venue is at Churchill). Feel free to contact me for further details. The organising committee would welcome expressions of interest from potential speakers"..... VK3KAI

Summer Field Day Jottings

Doug VK4OE writes ... *"It was a superb morning here, and I really enjoyed a couple of hours only on top of one of the commanding hills in Brisbane ... nothing special to report in the way of excellent propagation."*

"Three interesting anecdotes about QSO's in the field: Rod VK4KZR lashing together some disjointed modules across his bench to get himself onto 13cm; Glen VK4TZL breaking a welded bracket while trying to mount a 13cm antenna in the heat of the moment (would have been a good contact); and my finding out later that I had been operating (with some success.... probably due to the excellent location) on 70cm with both ends of the antenna's half wavelength coaxial balun wrenched free and disconnected! ... All good fun though!" VK4OE

On the Saturday night, 15/01/00, I counted only four stations as well as myself out in the Adelaide surrounds plus VK5SR/P in the SouthEast. The near 40-deg day temp kept a few people home it would seem. The SERG club station VK5SR was at Mt Graham about 40km NW of Mount Gambier, manned by Trevor VK5NC, Colin VK5DK & Tom VK5EE.

VK5KK/P PF94iq Near Mount Compass

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and VK5SR/P QF02hi, Mt Graham contacted each other on 144, 432, 1296, 3456, 5760 & 10368 MHz with signals 59 to ++ (especially on 5.7 GHz as always) over the 310km path. VK5SR/P also worked into Melbourne to VK3XPD/P on the same bands (~500km) as well as working VK3KAI as reported previously.

One notable contact took place at 1305Z, 15/01/00 using 432.150 MHz FM between VK5SR/P and VK5KK/P Handheld to Handheld! Signals 55 on peaks. I don't think a Hand Held distance record "section" exists in VK records! What say John!

VK5KK/P also worked VK3ATL/P QF22dn, near Ballarat on 15/2/00 144.295 MHz @ 1317Z 53, 432.15 MHz 55 @ 1357 & 1296.18 MHz @ 1408Z, 51. Distance 555km. Signals from Melbourne weren't good enough to make it from Adelaide, unfortunately.

24 GHz Records Tumble in VK3 & VK5

The bottom end of VK3 & VK5 has been alive with Narrowband 24 GHz in early February. VK3ZQB, VK5DK & VK5NC have all been out testing gear and breaking records to boot. All equipment is based on DB6NT Mk3 transverters and DB6NT LNA & HPA's running in the region of 70-80mW

Russell VK3ZQB ... *"Our contact (VK5NC/P3 to VK3ZQB/P3) 5/2/2000 on 24048 from Portland to Warrnambool was 72.9km distance, just a bit more than the (current) VK3 record. Not bad for a first up contact on new gear! The contact from Heywood to Tower hill was 69.6 km. As soon as we get some lift, we will be able to extend the distance without any effort!"* ... VK3ZQB

Colin VK5DK reports.... *"On 13/2/00 (Today) Trevor VK5NC & myself extended the VK5 24GHz distance record out to 78.53 kms from the old record of 38.5 kms. Contact was from Mt Graham to Mt Benson. The equipment used was DB6NT designed Transverters using SSB with an output of approx. 70mW into a pair of 400mm dishes at each end (1 for tx & 1 for rx). Signals were 5x9 both ways with excellent stability. More records to follow in the near future. Conditions today were only average with no lift at all and very windy."* ... Colin VK5DK

ATV

In a recent conversation with AR's Editor, Colwyn VK5UE he made mention of a growing need for an ATV column. Last month, this column gave some brief ATV jottings, however this was only a small scratch on what is happening in all states. Most will remember the columns in ARA and a number of articles in AR in years gone by. If you would like to take up the challenge, contact AR NOW!

Thank you to all who have contributed this month. Some general info has been held over till next month to allow some more room for band reports. Next month we will be into the equinox good and proper!

Lastly, while Mark VK5AVQ and myself were visiting Eric VK5LP the other weekend (routine maintenance!) we were left with the following to ponder...

1. Courage is the art of being the only one who knows you're scared to death.
2. Few people know how to hold a meeting. Even fewer know how to let it go.

Till next month
73's David VK5KK

STOP Press!!

On 17/2/00 1215z, VK3ZQB worked VK5NC and VK5DK on 24 GHz from Port Fairy QF11DP to the Bluff west of Mt Gambier QF02GG, a distance of 168.5km by grid locator. Sigs were 5-5 with qsb. At one stage sigs were 5-9 on the crest.at around 1030 - 1100Z, Not only is this a new VK5 & VK3 record, but possibly a new VK 24 Ghz record (subject to confirmation). More next month!

ar

Invitation from Japanese Amateur Radio Committee

We are the group of amateurs who managed to fulfil the dream of long-distance communication with 2mSSB and realised DX transmission with 2mSSB nationwide mobile communication.

This year is the 26th year of nationwide mobile communication and from 1997 we are communicating with some Asian countries by 2mSSB/DX mobile communication.

Among participants are Vladivostok (Russia), Seoul and Pusan (Korea), Taiwan and Hong Kong, and since last year we established QSO with Hong Kong as a major event.

This year we are inviting people from Shanghai, DU/VK to participate also.

We hope to promote international cooperation through amateur radio communication.

The 3rd Pan-Asian 2mSSB DX mobile communication

Time: 3 June 12.00 — 4 June 12.00: use horizontal waves.

We ask participants to inform us by SASE by the end of March (name, address, call sign, telephone number, mailing address). We will send details.

The 26th 2mSSB nationwide mobile communication

Time: 22 July 12.00 — 23 July 12.00; use horizontal waves

Please inform (name, address, call sign, telephone number, mailing address) by SASE by the end of April to the Executive Committee (address below).

We plan to use 21.350 frequency. Call by CQ—Japan and we'll inform the frequency. We also plan to do schedule QSO inside Japan.

Executive Committee
160-0022 Tokyo-to, Shinjuku-ku,
Shinjuku 1-17-13-308
Tel: 81 3 3226 0250
Fax: 81 3 3226 6520

Kiyoshi Honda

OVER TO YOU

We wecome your comments and feedback. Please keep letters as brief as possible, and send them to:

The Editor
Amateur Radio
PO Box 2175
Caulfield Junction Vic 3161

AWARDS

John Kelleher VK3DP
Federal Awards Officer
4 Brook Crescent, Box Hill South, Vic 3128 (03) 9889 8393

Nice to be back in the driver's seat after a sojourn in hospital. Somehow the January column again got lost "in the works!".

To other matters, I had just concluded a letter to a DX country expounding on all the absolute good qualities of the average Australian amateur operator, when, lo and behold, a letter arrived at my desk from a well known and active DXer. He quite honestly complained that his efforts to earn the WIA Grid Square Award on Six Metres was being curtailed by the lack of confirmation of contacts, namely QSL cards. But, that was not the only problem. To verify contacts for the abovementioned award, the Maidenhead Locator and name and address of the responder must be clearly shown on the QSL card.

So, after reading this short epistle, you have a twinge of concience, please go ahead and make this unhappy operator a very happy little vegemite.

Hold the reins for a minute, can you?

Late in April, or early May, I will find it necessary to return to hospital for my third operation. Instead of begging off, and claiming some R and R, I invite interested persons to submit Award columns for the May and June editions of the magazine. Please adhere to the Production Deadlines published on the bottom of page 2 of your current AR magazine. I also apologise for some tardiness in answering some correspondence.

POLAND

10 SP RTTY Award

This award is available to all licensed radio amateurs and SWLs in the following classes.

Class 1 - for 10 contacts /Swl rep. In Rtty mode with stations of Poland in all SP areas (SP1-SP9). Additional contacts with Polish Province LE (Leszno) or special event stations with prefix SN SP0 HF0 3Z0 are obligatory. A Qso with Polar Station HF0POL is also valid.

Class 2 - for 10 contacts /Swl in Rtty mode with stations in Poland.

Contacts with all SP call areas 1 to 9 is obligatory.

Class 3 - for 10 contacts /Swl in Rtty mode with different stations in Poland.

No date or band restrictions. Do not send QSL's. A GCR list must be certified by the Awards Manager of your Society, or by a radio club, or by two other licensed amateurs. Fee for the award is 10 IRC's, 10 DM, or 7 USD. Send applications to :-

Polski Zwiazek Krotkofalowcow

Zarzad Terenowy

P.O. Box 42

64-100 Leszno 7

Poland.

Here is a short list of stations known to operate from LE province in RTTY mode on HF:

SP3AMZ, CUG, DKH, FHT, LRS, MIN, PZK, ZFH and SP3ZHW.

Pilgrimages of the Holy Father, performed by the Pope John Paul II.

1. Availability. This award is available by individual amateur stations, club stations and Swl's in Poland, and worldwide.
2. Purpose. To commemorate the pilgrimages performed by Pope John Paul II, and to honour the personality of this great Pole. This award will be issued over an indefinite period.
3. Obtainment conditions. To perform confirmed contacts after 16 Oct 1978 with countries by Pope John Paul II during his pontificate. QSO's through satellite will not be acceptable.
4. Award Classes:

HF

Class 1 for contacts with 110 countries.

Class 2 for contacts with 75 countries.

Class 3 for contacts with 50 countries.

VHF

Class 1 for contacts with 15 countries

Class 2 for contacts with 10 countries

Class 3 for contacts with 5 countries.

On HF, contacts with Poland and Italy are obligatory. The fee is 10 Irc's 10 DM, or 7 USD. Send applications (GCR-list) to :-

Awards Manager PZK

Augustyn Wawrzynek SP6BOW

P.O. Box 42

64-100 Leszno 7

Poland.

Prefix list of countries visited up to December 1999, by the Holy Father.

A2, AP, C5, C9, CE, CN, CO, CP, CT, CX, D2, D4, DL, DU, EA, EI, ES, F, G, H4, HA, HB9, HB0, HC, HH, HI, HK, HL, HP, HR, HS, I, J5, J6,JA, K, KH2, KL7, KP4, LA, LU, LX, LY, OA, OD, OE, OH, OK, OM, ON, OZ, P2, PA, PY, S2, S5, S7, S9, SM, SP, T7, T9, TA, TF, TG, TI, TJ, TL, TN, TR, TT, TU, TY, TZ, V3, VE, VK, VU, XE, XT, YL, YN, YO, YS, YV, Z2, ZA, ZL, ZP, ZS, 3C, 3D2, 3DA, 3V, 3X, 4L, 4S, 4U1UN, 5H, 5N, 5R, 5V, 5X, 5Z, 6W, 6Y, 7P, 7Q, 9A, 9G, 9H, 9J, 9Q, 9U, 9V, 9X and 9Y.

Where's DX ?

Swaziland 3DA0 - Andre, 3DA0WPX, is QRV on 20m, usually between 1700 and 0000Z. QSL via ZS6WPX.

Vietnam 3W - Park, HL1ACP is QRV as 3W6AP. QSL via HL2AQN.

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Mayotte Island FH - Christian, 6W1QV, is QRV for five months signing FH/TU5AX. Active on 40 to 6 Metres, QSL via F5OGL.

Midway Island KH4 - Paul NZ7Q/ KH4, is QRV for another month, using CW on all bands. QSL via N6ZVA.

Franz Josef Land R1FJ - Nick R1FJV is operating daily on 20, 15, 12 and 10 metres until December 31, 2001. QSL via UA3AGS.

Antarctica - Mike, RW1AI is active as R1ANP from Progress base, until the end of March.

Poland SP - Special event station HF70PZK is active to celebrate the 70th anniversary of the Polish IARU member society. QSL via SP3CW.

Ghana 9G - Until March 20th , Andy G4ZVJ will be active using CW only.

QSL direct to Andy Chadwick at 5 Thorpe Chase, Ripon HG4 1UA, UK.

Tromelin Island FT/T - The Lyon DX group will be active from this most wanted country sometime around July or August 2000.

Svalbard Islands JW - LA9FJA will operate from this location signing JW9FJA for the next 7 months.

Switzerland - All Swiss amateurs may use the HB2 prefix during 2000.

Juan Fernandez Island CE0Z - A group from Finland hope to be active on this location from 17 March until 8 April. Calls used will be OH2MXS/CE0Z, OH2NSM/ CE0Z and OH3JF/CE0Z. Modes will be cw, Rtty, anddd some SSB. QSL by operator's direction.

Agalega 3B6 - A multi-national team headed by HB9BXE will be active from this QTH in October of this year.

The Andaman and Lakshadweep Islands. VU - Nat, VU2NTA reports that neither of these Islands is likely to be activated in the near future if the local government has its way. This government is clearly not in favour of any amateur operation from any location in this island group.

Brazil ZV - Look for Delson PY4AUN, signing ZV4D until April 30 to celebrate the 500th anniversary of the discovery of Brazil.

Possible New Entity

Chesterfield Islands TX0 - IOTA OC-176, located at 158 deg 19 min east, 19 deg 52 min South, will be activated by a multi-national group, from March 15 through April 1. This operation is sponsored by Yaesu Musen, and supported by the RSGB IOTA management. The Chesterfield Dxpedition web site is at - http://www.n4gn.com/tx0dx.

Association des Radio Amateurs de Nouvelle Caledonie, the Amateur Radio Society of New Caledonia announces an IOTA-based Dxpedition which may activate a new DXCC entity as well. The ARANC expedition is headed by Eric Esposito FK8GM. Pending this body's application for IARU membership, the second phase of the operation may turn out to be the initial operation from a new DXCC entity, starting on March 23.

The expedition has secured a landing permit, and the transportation arrangements are being worked out from Koumac, at the northern tip of New Caledonia.

The radio operating team consists of FK8GM, FK8HC, JA1BK, N4GN, OH1RY, OH2BC, OH2BH and team doctor OH2RF. Several experienced pilots are co-ordinating the communications in and out of the Chesterfields and providing a continuous weather watch, because the Coral Sea typhoon season is still very active during March. These pilots include F6AJA, FK8CR,JH1KRC, K6GNX, and VK3EW.

TX0DX will have two QSL managers :- Jarmo Jaakola, OH2BN - for HF QSO's only, and Kan Mizoguchi, JA1BK - for 6 metre QSO's only.

Best 73, and good hunting, de John VK3DP

George Bass Award

The WIA Victoria George Bass Diploma aims to encourage more VHF and UHF simplex operation between mainland Australia and Tasmania - in other words, across the Bass Strait.

To qualify, mainland stations need to contact five VK7's on a single mode and a single band to qualify, while VK7's require to make 20 mainland contacts.

All operation must meet the diploma rules and comply with WIA Band Plans. Disqualification may occur for using FM in a SSB band segment, or prolonged operation on DX calling frequencies.

The rules are simple:

Operation must be two-way simplex telephony contacts across Bass Strait, between November 1, 1999, and April 30, 2000.

Only FM or SSB modes are permitted on the 6-metre, 2-metre and 70-centimetre bands. Mainland stations must work five VK7 stations on a single band

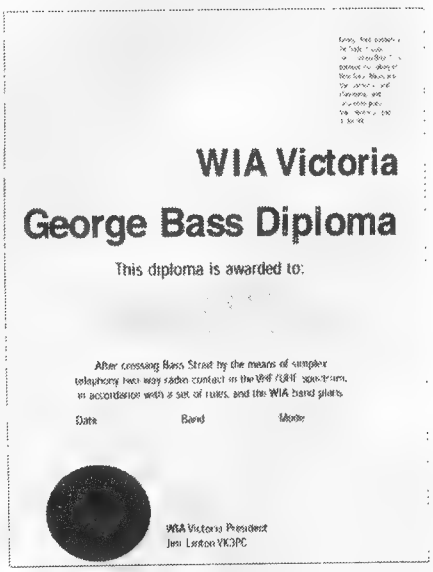
VK7 stations require 20 mainland contacts on a single band. Diplomas are issued for single mode (FM or SSB) only.

Only one callsign may be used by each radio amateur (no multiple callsigns).

To claim a diploma, send a signed copy of a log of contacts, plus $5 to:

WIA Victoria
George Bass Diploma
40G Victory Boulevard
Ashburton 3147

Claims received more than one month after the diploma period will not be accepted


WIA Victoria

George Bass Diploma

This diploma is awarded to:

After crossing Bass Strait by the means of simplex telephony two way radio contact on the VHF/UHF spectrum, in accordance with a set of rules, and the WIA band plans.

Date Band Mode

WIA Victoria President
Jim Linton VK3PC

ar.

CONTESTS

Ian Godsil VK3DID,
57 Nepean Highway, Aspendale, 3195

Contest Calendar
March — May 2000

Mar 4/5	ARRL International DX Contest (SSB)	(Jan 00)
Mar 11/12	RSGB Commonwealth Contest (CW)	(Feb 00)
Mar 11/12	World Wide Locator DX Contest (CW/SSB)	(Feb 00)
Mar 18/19	John Moyle Field Day (SSB) - VHF-UHF	(Feb 00)
Mar 18/19	Russian DX Contest (CW/SSB)	(Feb 00)
Mar 25/26	CQ WW WPX Contest (SSB)	(Feb 00)
Apr 1/2	SP DX Contest (CW/Phone)	(Mar 00)
Apr 8/10	JA DX CW Contest (High Band)	(Dec 99)
Apr 8/9	King of Spain DX Contest (CW/Phone)	
Apr 15/16	Holyland DX Contest (CW/Phone)	(Mar 00)
Apr 22/23	Helvetia DX Contest (CW/Phone)	(Mar 00)
Apr 22/23	SP RTTY Contest	(Mar 00)
Apr 24	Low Power Spring Sprint (CW)	(Feb 00)
Apr 25	Harry Angel Sprint (CW/SSB)	(Mar 00)
May 6/7	ARI International DX Contest (CW/SSB/RTTY)	
May 13/14	CQ-M International DX Contest (CW/SSB/SSTV)	
May 13/14	Sangster Shield NZART (CW)	
May 27/28	CQ WW WPX Contest (CW)	(Feb 00)

Thanks this month to NZART VK4NEF VK4TI

Erratum: Australian Postcode Contest (listed for April 2000) – as I was about to send this to the Editor I received news that this contest will longer be held. It was not very well patronized last year, but still it is a shame to lose a local event from the calendar. VK2CA has made a suggestion for a revamp for future years. Thanks Allan.

Greetings to all contesters and readers. How is your station? Good or in need of some checking in preparation for some of the bigger contests, and our forthcoming VK/ZL contest season in Winter. NOW is the time to check through and see that everything is in order.

In December I wrote about some of the difficulties with the RD Contest last year. It saddens me to report that NO-ONE bothered to reply. Do you not care what happens with the scoring, or even that other contesters are concerned to see difficulties and improvements of any type being addressed ? Is it a question of "They" will deal with that?

If that is so, then we are in danger of missing out —just like the operator who was asked if he would help a fellow Ham on another band, but who refused on the grounds that he was talking to his Ham mates on the Internet. Well, that is his approach, but it will be the stone end of Amateur Radio if we all think like that!!

As regards the RD, I would like some input on the updating of categories to accommodate newer modes, please. Even if you don't want them, please SAY SO. Otherwise "They" WILL fix it up! Don't let the giant sleep, but wake him up.

QRP is very much alive and well both here in VK and overseas. There are several contests for this style of operating and I commend them to you, both as a possible change in your operating habits and as a challenge. They really are good fun, provided that you are prepared to treat them seriously. Please see the Calendar boxes for dates. If the details are not in this column, please ask me by phone or e-mail.

73 and good contesting. Ian Godsil VK3DID Phone: 0408-123-557

E-mail:<contests@radiomag.com>

continued next page

continued from previous page

Results CQ-M Contest 1999

(Call\cat\score\place)

VK8AV	SOMB	CW	630	2nd
VK4TT	SO14	CW	960	

SP DX Contest

1/2 April

1500z Sat – 1500z Sun

Categories: single operator (single/all band), multi-operator and SWL.

Bands: 160 - 10 m (no WARC)

Modes: CW and SSB. No mixed mode logs allowed.

Send RS(T) plus serial number. SPs will send RS(T) plus a two-letter province code.

Score three points per QSO with each Polish station.

Final score is total QSO points X number of Polish provinces worked (max 49). In this contest,

Multipliers are counted once only. SWLs must receive the callsign and number sent by Polish stations, plus the callsign worked. Each SP may be logged only once per band.

Send log, summary sheet and multiplier check sheet postmarked by 30 April to: SPDX Contest Committee, Box 320, 00-950 Warsaw, Poland. Disk logs in ASCII format are welcome.

Polish provinces are: *SP1*: KO SL SZ; *SP2*: BY EL GD TO WL; *SP3*: GO KL KN LE PI PO ZG; *SP4*: BK LO OL SU; *SP5*: CI OS PL SE WA; *SP6*: JG LG OP WB WR; *SP7*: K9I LD PT RA SI SK TG; *SP8*: BP CH KS LU PR RZ ZA; *SP9*: BB CZ KA KR NS TA.

Holyland DX Contest

16/17 April

1800z Sat - 1800z Sun,

Object is to work as many Israeli stations as possible.

Bands: 160 - 10 m (no WARC).

Categories: single and multi-operator multi-bands; SWL.

Send RS(T) plus serial number. Israeli stations will send RS(T) plus area code. The same stations may be contacted on both CW and SSB on each band.

Score two points per QSO on 160/80/40 and one point on 20/15/10.

Final score is total points X total areas, with areas counted separately for each band. SWLs should report Israeli stations only, and include time, callsign, station worked, RS(T) plus area code and points.

Send summary sheet and separate logs for each band, postmarked by 27 May 2000 to: Contest Manager, Israel Amateur Radio Club, Box 17600, Tel Aviv, Israel 61176.

Helvetia DX Contest

22/23 April

1300z Sat - 1300z Sun,

Work only Swiss stations, CW on 160 - 10 m and SSB on 80 - 10 m (no WARC). Each station may be worked only once per band regardless of mode.

Score three points per QSO.

Multiplier is total number of Swiss cantons worked (max 26 per band).

Send log to be received by 10 June to: Niklaus Zinsstag HB9DDZ, Salmendorfli 568, CH-4338 Rheinsulz, Switzerland.

Cantons are: AG AI AR BE BL BS FR GE GL GR JU LU NE NW OW SG SH SO SZ TG TI UR VD VS ZG ZH.

SP DX RTTY Contest

22/23 April

1200z Sat - 1200z Sun,

Categories: single operator all bands; multi-operator all bands; SWL.

Use Baudot mode only

Bands 80 - 10 m (no WARC).

Call CQ SP RVG TEST.

Exchange RST plus serial number.

Score two points per QSO with own country, five points with other countries in same continent and ten points with other continents.

Multipliers are the sum of DXCC countries and Polish provinces (max 49).

Send logs postmarked by 23 May to: SPDX RTTY Contest Manager, Box 253, 81-963 Gdynia 1, Poland.

Harry Angel Memorial Sprint

Tue 25 April, 2000

1100z - 1246z

This is the second year of a Contest to remember VK's oldest licensed operator, Harry Angel. Please note the time length of the Contest - 106 minutes, Harry's age when he died in 1998. It is open to all appropriately qualified HF operators.

Object is to make as many contacts as possible.

Band 80 metres,

Modes CW and SSB.

Categories: Single Operator (CW, Phone, Mixed) and SWL.

Frequencies: CW: 3500 - 3700 kHz, Phone: 3535 - 3700 kHz. Contacts in DX window not permitted.

Exchange RS(T) and serial number; revert to 001 if 999 reached.

Score two points per CW QSO and one point per Phone QSO.

Stations may be worked once only per mode.

Logs must show time UTC, callsign worked (both callsigns for SWLs), mode, RS(T), serial numbers sent and received for each QSO. Send summary sheet showing name and date of Contest, name and callsign of entrant, category entered, address, equipment used, points claimed and a signed declaration that the rules and spirit of the Contest were observed.

Send logs to Harry Angel sprint, PO Box 1647, Toowoomba, 4350, by Friday, 26 May, 2000. Logs may also be sent by e-mail in plain ASCII text to: *<awards@wiaq.powerup.com.au>*

QSLs for VK0ERZ

QRV at Davis base in the Antarctic is Lance VK0ERZ. He is with the expedition down there and has his HF gear with him. He is on the air most nights at about 1200UTC on 14.225MHZ+/-QRM. His QSL manager and father is Humphrey VK2FUN or QSL via the bureau.

SPOTLIGHT on SWLing

by Robin L. Harwood VK7RH
5 Helen Street, Newstead Tasmania 7250
(03) 6344 2324
E-mail: robroy@tassie.net.au

Digital Radio Broadcasting just around the corner

There was plenty of discussion recently about the many digital standards for audio and video broadcasting. Up to the present, two main standards for the digital radio broadcasting have emerged yet they are incompatible.

There has been some acrimony over which standard should be implemented. There is a European standard, otherwise known as Eureka 147 with some European broadcasters, mainly Germany and the U.K, putting trial programming to air. However there are very few receivers, commercially available at an affordable price.

Just to demonstrate this, one of the London commercial stations was putting out a trial broadcast complete with a 50 Hz hum. Nobody noticed it, including the stations' own technical staff, because they did not even have their own receiver to monitor the transmissions. A technical journalist was the first to report the fault to them, some weeks into their test. Nothing really happened for another couple of weeks until they obtained a receiver! If this had happened on a conventional broadcasting mode, it would have been noticed and speedily rectified in minutes.

To get some uniformity, a recent conference was held in Sydney (NSW) between the broadcasters, planners and importantly the commercial sector, which has to manufacture and market suitable receivers. It was agreed that a uniform worldwide standard is imperative, if digital audio broadcasting is to become commercially viable. So the two major digital audio platforms agreed to work together to achieve this objective.

One thing they did agree on is to rename Digital Audio Broadcasting (DAB) as Digital Radio. Now this will be confusing because there are already digital radios. Digital radios as we have them at present, have digital readouts to distinguish them from analogue and will not be capable of decoding the digital audio. Receivers that currently are available of decoding the Eureka 147 standard are prohibitively expensive in the U.K, costing between 400 to 800 pounds and naturally are not selling well, as the existing FM standard tuners are more affordable and popular.

The application of digital broadcasting over short wave has already commenced with tests from Bonaire, Rampisham and Juelich. These are three major transmitting sites in Europe. Tests have also been conducted from Sackville in Canada. The format chosen is a modified form of the MPEG-3 standard. Initial tests, as reported by Nigel Holmes of Radio Australia, are promising yet it does depend on the number of hops. Receivers further away from the sender will experience more dropout and distortion, than those between 1,600 and 3,000 kilometres. Significant improvements can be expected at that distance. The tests, although promising, are rather inconclusive at this stage because further evaluation of the technology and the costs of implementing this have still to be worked out. At present, only expensive professional test receivers are capable of decoding these transmissions. Once a suitable format has been agreed, large-scale commercial production of receivers could start. Also the format needs to be uniform for domestic as well as short wave audio broadcasts.

I also think that, as there are many thousands if not millions of existing sets about, it should be very easy to utilize a suitable software programme with the computer sound card to decode these audio transmissions.

Austria in the News.

There were comments on one of the shortwave forums on the Net, about the presentation and content of Austrian Radio International (ORF). Most agreed it was rather boring and probably had few listeners. Well, that has all changed with a new coalition government being formed with the extreme right-wing Freedom Party, a junior member.

The party is led by a Herr Haider (or (Haidl) who has never disguised his admiration for Hitler and the Nazis. Once this party became part of Austria's government, many nations immediately imposed sanctions. Violent demonstrations also erupted in Vienna, in an effort to topple the government.

The audience to the ORF must have dramatically escalated, listening to the continuing drama and upheaval. The best frequency to hear Vienna here is 21765 kHz at 0930 UTC. It is in English. Another very easy channel is 13730 kHz and this is mainly in German.

Changes: The BBC World Service is to increase the number of programming streams from three to eight, as from March 25th. This is when parts of the Northern Hemisphere adopt Daylight Saving.

The increase in streaming is going to be very interesting yet somewhat confusing. Changing to a lower or high frequency may result in a completely different programme stream to the one you require "Communications World", the VOA media programme, is once more in a complete 25 minute segment. It was broken up into three separate ten-minute slots. However bowing to the requests of listeners, the programme was revamped early in February. The best time to hear it here is at 0935 UTC on Saturdays.

In conclusion: Don't forget that major frequency and programming alterations from 0100 UTC on the 25th of March. As earlier mentioned, this is when Daylight Saving commences in some of the Northern Hemisphere. We also go off Summer Time on the same date until the last week of August. It is being brought in earlier this year for the Sydney Olympics. Please also take note that my e-mail address is now vk7rh@primus.com.au. Until next time, the very best of monitoring and 73- Robin L. Harwood VK7RH.

ar

RMB 1627 Milawa Vic. 3678
Email: vk3jt@amsat.org

National co-ordinator:

Graham Ratcliff VK5AGR Email: vk5agr@amsat.org

AMSAT Australia net:

The AMSAT-Australia net meets formally on the second Sunday evening of the month. During the winter months in South Australia (end of March until the end of October) the net meets on 3.685 MHz +/- QRM with an official start time 1000 UTC with early check-ins at 0945 UTC. During the summer months when daylight saving is in operation in South Australia (end of October until end of March) the net meets on 7.068 MHz +/- QRM with an official start time of 0900 UTC with early check-ins at 0845 UTC. The times and frequencies have been chosen as the best compromise for an Australia-wide net taking into consideration seasonal propagation changes and the various state summer time variations.

AMSAT Australia newsletter and software service:

The newsletter is published monthly by Graham VK5AGR. Subscription is $30 for Australia, $35 for New Zealand and $40 for other countries by AIR MAIL. It is payable to AMSAT Australia addressed as follows:

AMSAT Australia
GPO Box 2141
Adelaide SA 5001

Keplerian Elements

Current keps are available from the internet by accessing the AMSAT FTP site, ftp.amsat.org and following the sub-directories to "KEPS".

Multiple Satellite Launch Includes New Pico-Sats

After many delays, a USAF Minataur rocket successfully launched a complex payload into orbit on 26th January. The launch included several amateur radio packages.

A joint project between USAF and Weber State University called JAWSAT served as a launcher bus for Stanford University's Orbiting Picosat Automatic Launcher (OPAL), Arizona State University's ASUsat-1 and the USAF research lab's Optical Calibration Sphere.

The primary payload was the USAF Academy's FalconSat. OPAL appears to be healthy and is responding to commands. At the time of writing one pico-sat has been launched and is being commissioned. The ASUSat-1 ran for a day or so and then due to battery charge problems, stopped transmitting telemetry. The control team is trying to effect a recovery. ASUSat-1 contained an amateur packet hardware system and a 2m/70cm FM voice repeater, so it will be sad if it cannot be recovered. Hank, N4AFL, reports that StenSat is tentatively scheduled to be released from the OPAL satellite shortly after launch.

After the release command, StenSat will be ejected from OPAL with the batteries completely discharged. After approximately one or two hours of exposure to sunlight StenSat should wake up and start transmitting telemetry consisting of a standard 1200 baud AX.25 (AFSK) telemetry packet every 5 seconds and a Morse code ID that will be sent every four minutes. StenSat's uplink frequency is 145.84 MHz and the downlink is 436.625 MHz. More on the outcome of these launches next month as the commissioning continues.

The USAF Research Lab's Optical Calibration Sphere (OCS) is a 2 metre diameter reflective sphere which has already been sighted with the naked-eye. Opportunities may be limited in this part of the world due to its orbital times being mostly in daylight or dusk periods. Worth a try though. The keps are available from the usual sources.

MIR Space Station News.

Information regarding the fate of MIR has proved to be most unreliable in the recent past, but it appears that Russia has launched a Progress cargo rocket to Mir carrying fuel and supplies. They are planning to send another crew to Mir in March. The supply rocket docked automatically, with fuel, water and other supplies, plus equipment needed to build up pressure inside Mir, which has a minor leak. At this time it's not known if Amateur Radio gear aboard MIR will be reactivated.

International Space Station News.

NASA reports that a team developing a prototype International Space Station 'lifeboat' called the X-38 Crew Return Vehicle successfully flew the largest parafoil parachute in history last week at the U.S. Army's Yuma Proving Ground. They successfully released a parachute with an area almost one and a half times as big as the wings of a Boeing 747 jumbo jet.

Yet Another Antarctic Expedition.

Ronald KE6JAB has been at it again. He sent this report to the AMSAT News Service on his return home from Antarctica last month:

"Hi folks,

I arrived back home from Antarctica 3 days ago, just one month late. We had a very successful time using the Pacsats Uo-22 and Ko-25, uploading daily reports and one or two photos each night.We used the Arrow dual band yagi throughout the trip, and because of the smallness of our tent we had to do all uploads 'outside'.This proved unpleasant in bad weather when the wind was blowing snow or the temperature was just too cold.

(see http://www.thistle.org/dml/photos/index.cgi?rr_120~1.jpg)

Having enough power in the batteries was always a concern. We relied on solar panels for recharging everything. Fortunately in the area of our expedition we were blessed with much sunlight for long periods.

One of the most useful devices was the PalmPilot and a satellite prediction program called PocketSat. Mike, KF4FDJ, demo'd this to me at the Amsat Symposium in San Diego. This saved us from powering up the laptop, till just before the pass. It was referred to constantly. We encountered no software problems using Wisp or anything else on the laptop. However, the laptop needed rebooting often when the temperature dropped below –15°F. This was usually in the middle of an upload ! Another successful part of the trip was the testing of a small weather station. This was built by Holda, KF6VIC a student of Professor Bob Twiggs at Stanford University. It used amongst other things a MIM module sending telemetry in APRS format. The station was placed high up on a nunatak, and transmitted every 20 minutes towards our area in the mountains, up to 24 miles away. We copied the data using a TH-D7 HT, then retransmitted it back to Holda on the Pacsats.

(see http://www.thistle.org/dml/photos/index.cgi?WthrSta.jpg) Several Hams were key players in helping to get our messages and photos back to our friends and family. They were Ed, KE6IZN, Roy,W0SL, JERRY,K8SAT and KRISTI,N8WS. A very big thank you to all of them and to all the others who sent us messages on the birds. We appreciated reading all the messages while we huddled in our small tent. More on the expedition can be read at http://www.thistle.org/dml/ best regards, Ronald, KE6JAB".

High Speed Data Acquisition from UO-36 (and others).

The February issue of the AMSAT-VK Newsletter contained a not-to-be-missed article by Colin Hurst VK5HI on this topic. Colin has spent some years developing software to cope with the ever-increasing complexities of the amateur radio satellite imaging systems employed on the current series of satellites, particularly those from University of Surrey, England. The results obtained from the earth-imaging cameras on board UO-36 are spectacular to say the least. In this article, Colin concentrated on the hardware side of things. Whilst there are other approaches, he is developing a system based around a circuit board from a German company called SYMEK. Colin's article details the modifications necessary to the receiver, the TNC and the modem. It is recommended reading for anyone contemplating a move into this exciting area. Colin's results are on the table and the article will make it possible for anyone with a reasonable grounding in the digisats to duplicate his results. As with any project "at the cutting edge", more developments are on the way. They will be reported in detail in the AMSAT-VK Newsletter and are sure to be discussed on-air during the AMSAT-VK monthly nets. This topic has also received its share of bandwidth on the AMSAT-BB bulletin board. Watch for more exciting news on this front as the download baud rates on the birds are increased from 38k4 through to 56k and beyond.

73, Bill...VK3JT

ar

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HF PREDICTIONS

by Evan Jarman VK3ANI
34 Alandale Court, Blackburn Vic 3130

These graphs show the predicted diurnal variation of key frequencies for the nominated circuits.

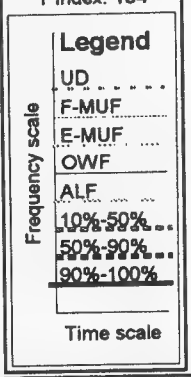
These frequencies as identified in the legend are:-

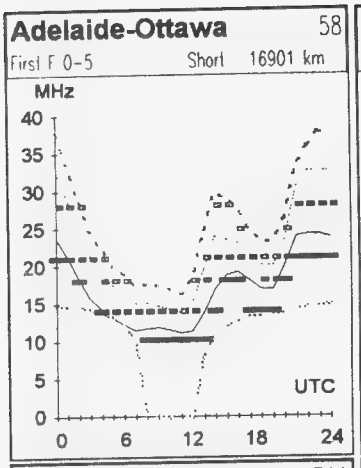
- Upper Decile (F-layer)
- F-layer Maximum Useable Frequency
- E-layer Maximum Useable Frequency
- Optimum Working Frequency (F-layer)
- Absorption Limiting Frequency (D region)

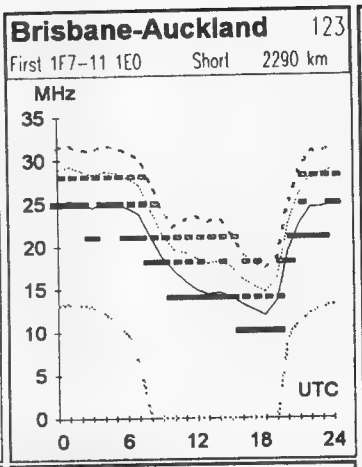
Shown hourly are the highest frequency amateur bands in ranges between these key frequencies; when usable. The path, propagation mode and Australian terminal bearing are also given for each circuit.

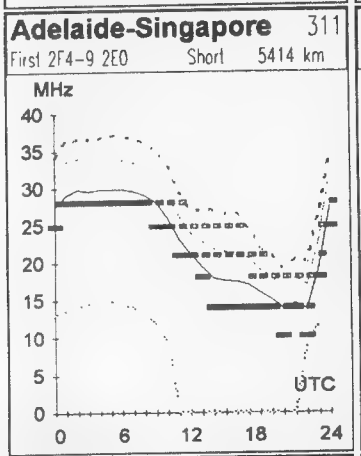
These predictions were made with the Ionospheric Prediction Service program: ASAPS version 4.

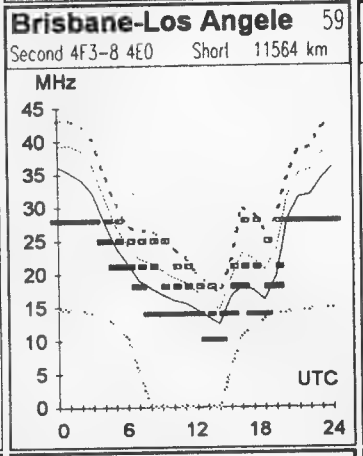
March 2000
T index: 134

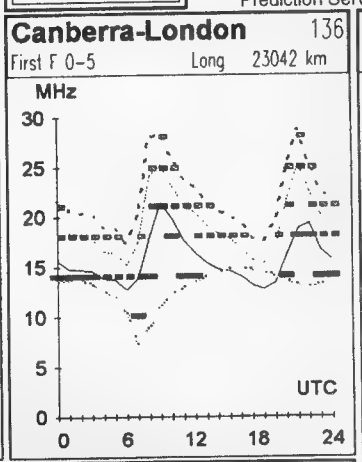


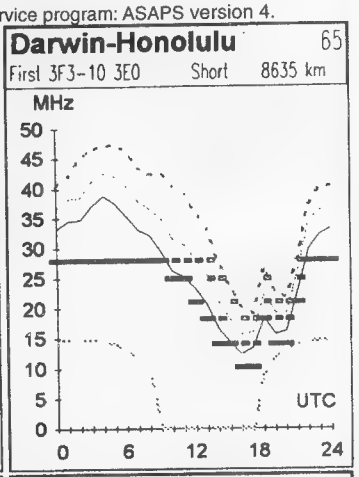


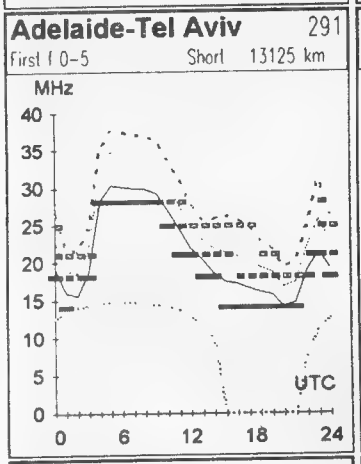


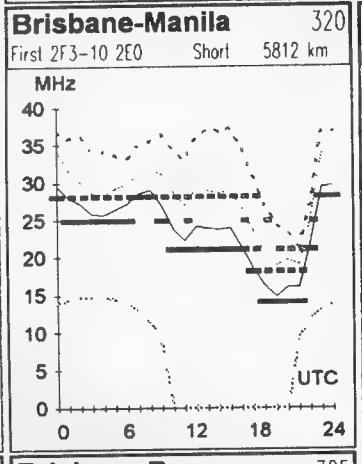


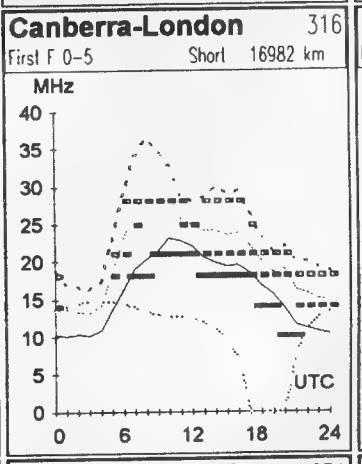


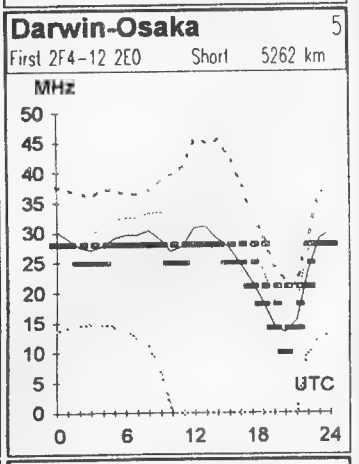


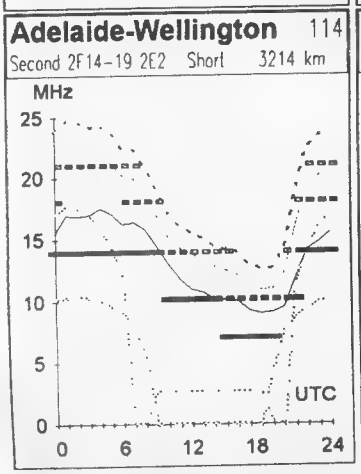


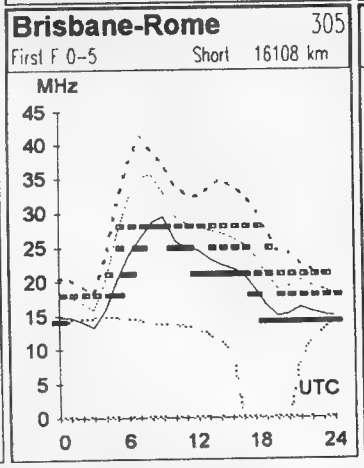


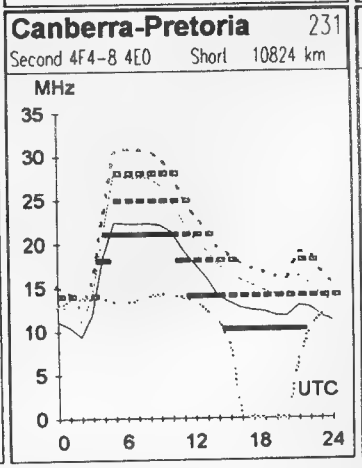


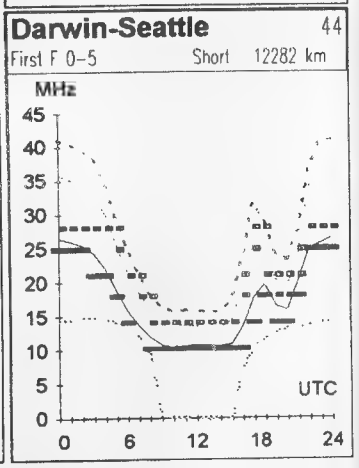




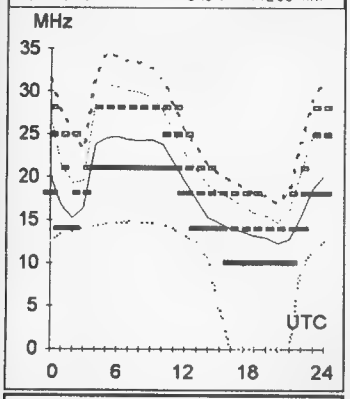




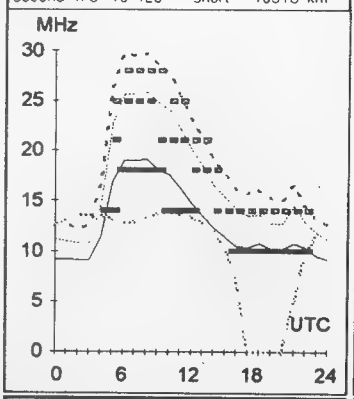




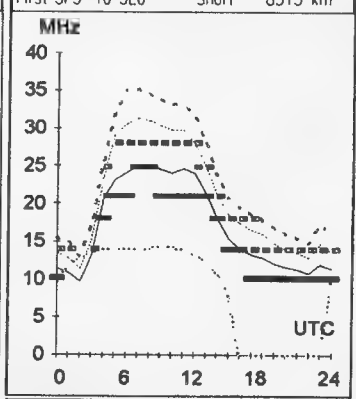
Hobart-Cairo 278
First F 0-5 Short 14263 km



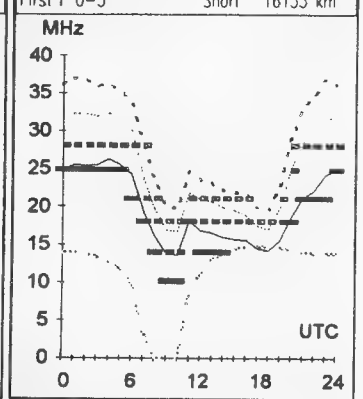
Melbourne-Capetown 222
Second 4F5-10 4E0 Short 10318 km



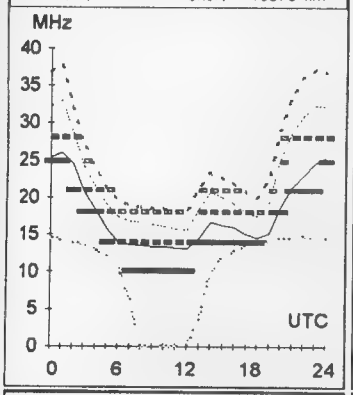
Perth-Johannesburg 248
First 3F3-10 3E0 Short 8315 km



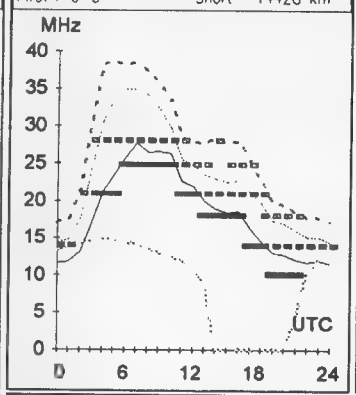
Sydney-Barbados 119
First F 0-5 Short 16155 km



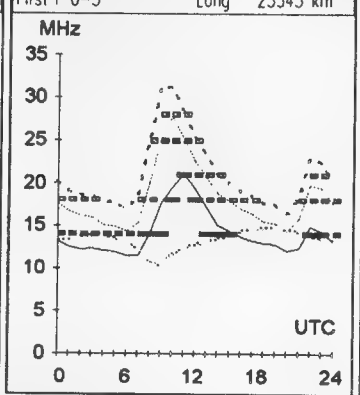
Hobart-Chicago 72
First F 0-5 Short 15576 km



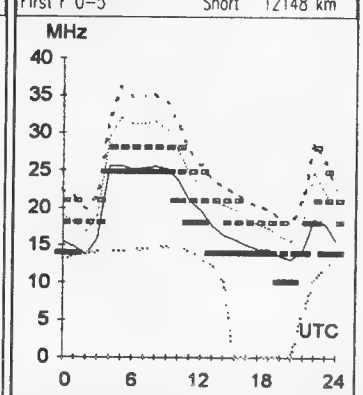
Melbourne-Moscow 316
First F 0-5 Short 14428 km



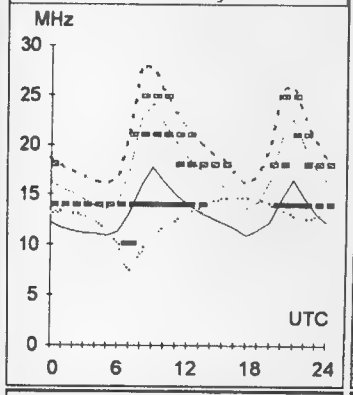
Perth-London 133
First F 0-5 Long 25543 km



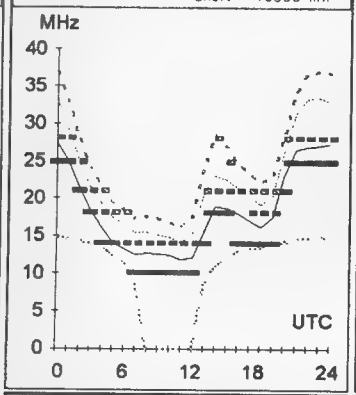
Sydney-Nairobi 255
First F 0-5 Short 12148 km



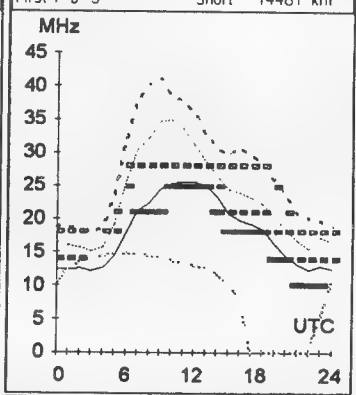
Hobart-Oslo 138
First F 0-5 Long 23451 km



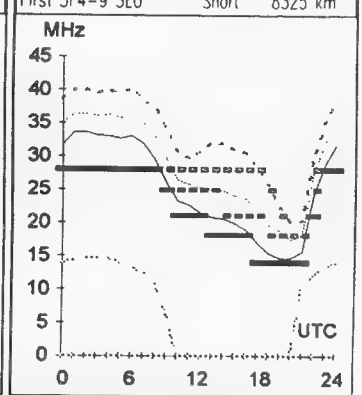
Melbourne-Ottawa 63
First F 0-5 Short 16566 km



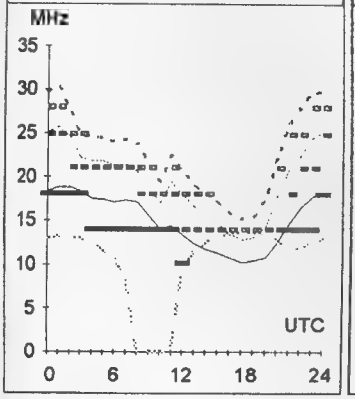
Perth-London 313
First F 0-5 Short 14481 km



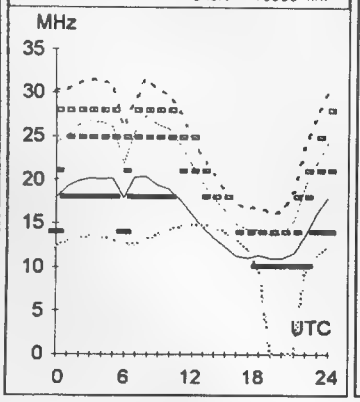
Sydney-Seoul 340
First 3F4-9 3E0 Short 8325 km



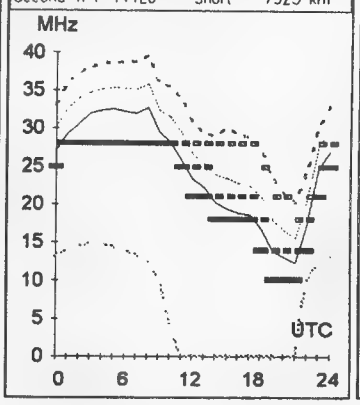
Hobart-Santiago 149
Second 4F5-9 4E0 Short 10686 km



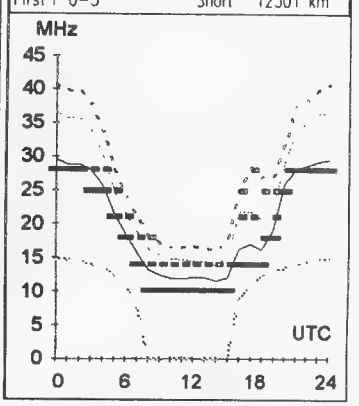
Melbourne-Senegal 219
First F 0-5 Short 16909 km



Perth-Tokyo 20
Second 4F4-114E0 Short 7923 km



Sydney-Vancouver 45
First F 0-5 Short 12501 km



HAMADS

- Hamads may be submitted on the form on the reverse of your current Amateur Radio address flysheet. Please print carefully, especially where case or numerals are critical.
- Please submit separate forms for For Sale and Wanted items, and be sure to include your name, address and telephone number (including STD code) if you do not use the flysheet.
- Eight lines (forty words) per issue free to all WIA members, ninth and tenth lines for name and address. Commercial rates apply for non-members.
- Deceased estates Hamads will be published in full, even if the ad is not fully radio equipment.
- WIA policy recommends that the serial number of all equipment for sale should be included.
- QTHR means the address is correct in the current WIA Call Book.
- Ordinary Hamads from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.
- Commercial advertising (Trade Hamads) are pre-payable at $25.00 for four lines (twenty words), plus $2.25 per line (or part thereof), with a minimum charge of $25.00. Cheques are to be made out to: WIA Hamads.
- Copy should be typed or in block letters, and be received by the deadlines shown on page 1 of each issue of Amateur Radio, at:

Postal: *Newsletters Unlimited, 29 Tanner Street, Richmond, 3121*
Fax: *03 9428 4242* *E-mail: newsl@webtime.com.au*

Please only send your Hamad once
Please send Hamads by mail OR fax OR email (much preferred).
Please do not send by more than one method for any one ad or issue, it is confusing.

FOR SALE NSW

• **Kenwood TS-940** in mint condition to swap for **Kenwood TS-850** in mint condition. I am willing to barter. Phone AH 02 6453 8759 or email mackie@post.com. Bob

• **DSE Model K-3206** 0-40v 3A benchtop power supply. Current limit approx 30 mA to 3.5A in two ranges and features meters for both voltage and current readings. New and never been used. 240v AC input. $215 ono. Art VK2AS QTHR 02 9416 7784

• **Tech Tradiper TE-15 440 kc 280 Mc**. No book but have full manual. Leader 4DM815 TR DIP meter. Offers S Dogger, Tunnel Road, Stokers Siding 2484. 02 6677 9292 AH

• **Icom IC82OH 2m/70cm** all mode base station $1500. **Yaesu FT650** 6m/10m/12m all mode 100W with CW filter and tone options $850. **Kenwood TM** 461A 70cm 35W mobile, latest model $400. **FT290RII** All-mode 2m with FL2025 25W matching linear $580. **FT790RII** 70cm all mode with FL7025 25W matching linear. All as new. Brad 0413 596 442

• **INTERNET Connect** from Port Macquarie to the Gold Coast from 80c per hour. Summerland Amateur Radio Club. For info - http://www.nor.com.au/community/sarc/sarc.htm Harry VK2XIO, QTHR, cascom@nor.com.au. PO Box 293, Lismore, 2480. Ph 02 66216096

WANTED NSW

• **Schematic circuit Compucon** 14 inch advance VGA colour monitor type SV1482 It loses the red colour now and again. Any help with this fault would be greatly appreciated. Art VK2AS QTHR 02 9416 7784

FOR SALE VIC

• **Receiver Manuals** and CRO handbooks sale. Eddystone models EC958, S770U and two of model 770R. Drake model SPR4 and two of model SW-4A. Also ATE model RLS6 Radio Link manual. $15 each. Tektronix CRO manuals for type 524AD and type 535/545 and plug-in type 53/54L $25 each. VK3FFX ph 0409 027 835

• **Scope S54A-P7** excellent condition & handbook $80. **Polar SP/BB** var caps, several 10, 25, 100 pF $5 each. **Variacs 240/280** 1 X 4A, several 8A, $20-$40 each. **Gas laser & PSU**, Hi-Vis red EC $40 FC 707 ATU, & handbook $60, no deliveries. VK3DYD QTHR 03 9555 6714

• **Icom IC551D** Six metre all mode 80 watt output. s/n 01297. Comes with manuals, diagrams etc. In very good condition. $550.00 Tony . VK3CAT. QTHR 03 95963367 AH

• **Yaesu FT900** (not 100 as Feb AR). All HF bands, all modes, NB, processor, keyer, detachable front panel for mobile etc. More features than the 840. New in carton $1250. Andy, Croydon 03 9723 8380.

WANTED VICTORIA

• **1) Radio compass** MN-31 BC-433G SCR-269G. Good price offered for complete manual. 2) **Canadian Marconi HF/TX TM11** original condition. Trevor VK3PP 03 5441 1197 reverse charge.

• **Desperately seeking a GELOSO G209-R** the Receiver Companion to the Transmitter G222-TR, I know they must be out there!. If you have one gathering dust I'll be happy to take it off your hands for a good price including shipping. Contact me Clint VK3CSJ on 03 97924500 or BH 03 92124070 or email at csjeffry@ozemail.com.au

• **Wanted to Buy or Swap Collins 32S-3** Transmitter : Dead or Alive (without too many modifications if possible). **Collins 516F Power Supply:** Preferably in working condition but will consider anything. **Collins 30L-1 Amplifier**: Dead or Alive. I'd also like to borrow, or buy if necessary, the **Collins Service/Maintenance Videos Tapes** for the 32S-3, the 75S-3, the KWM-2/2A and the 30L-1 Linear. Any help would be greatly appreciated. Please contact Carl, VK3EMF. Tel. AH: 97299728 E-mail: carls@alphalink.com.au

FOR SALE QLD

• **Silver Eagle** with TS-120S, no PSU, needs work, 21+28 MHz OK. **Also hand mike** and handbook. Paul VK4DJ tel 07 4778 6031

• **Mirage D26** 430-450 MHz, all mode 2/60W UHF amp, new condition S.N. 7517.193, 12 volt DC, $325 posted **MFJ Tunable DSP filter** model MFJ784 12vDC. Good working order $225 posted. Gordon VK4KAL QTHR or Ph & fax 07 4985 4168 evening please

• **Yaesu FL7000 amp** with auto ATU $2400. **Yaesu FT901** Transceiver $300. **Kenwood TS-520** and ex-VFO $280. **Icom IC-701**, IC-701PS, IC-EXI, IC-RM3, IC-SM2 $300. **Leader Sig-Gen** 0.1-30MHz, 75-115 MHz $200. **Two 3 element Tri Band** Beams $140 each. **133 Pentium computer** 16mb RAM 1 Gig HD in Minitower, keyboard Windows 95 $280. John VK4AJS 07 4939 5724 or 0429 395 724

• **HTX-100,** 10 Meter SSB/CW trancvr. Complete with Mic, mobile bracket. 25W output. This is a Brand New Radio, tested but never used, in original packaging. Covers 28.0 to 29.7 MHz. 10 mems. Perfect cond.$150. VK4EJ.QTHR. (07)3205 5098 or vk4ej@telstra.easymail.com.au

• **SHACK CLEARANCE**. All the following are in good to excellent working condition & for sale by tender: **JRC NRD525 HF RX** "The Rolls Royce of radios" 90Hz - 34 MHz, 200 mems, notch, IF shift, scan, sweep etc, etc, etc. Excellent condition. **TONO Theta 7000 RTTY/CW/ ASCII computer** 1 - 44 wpm, 45.45, 50, 56.88, 74.2 Baud RTTY with 170, 425, 850 Hz shifts, 110, 300 Baud ASCII. AFSK, FSK, CRO TAPE, TV, PC, RADIO connections. 7 "brag" memories & type-ahead buffer. 12v @ 1 amp. **Yaesu FT77S** HF TX SSB/CW/FM 10 Watts out. 12v @ 3 amps. Used as 6mx TX through FT107R transverter. **Yaesu FT107R** transverter with 6mx, 2mx, 70cm modules, 3 satelite & repeater modes. Has output for 2nd RX using 10mx band. **Yaesu FV700DM** external digital VFO 12 memories, fast/slow sweep. Matches FT77, FT707 etc. **Yaesu FRG8800** HF RX 150Hz - 30MHz, AM, FM, SSB, CW, 12 mems, 3 scan modes. 12v & 240v. **Yaesu FT707** HF TX 100W SSB, CW, AM. also works with FT107R transverter. 12v **Realistic Pro2006 400 channel scanner**. 25 - 1300MHz AM, NFM, WFM 12V & 240V **Yaesu FT208R** 2mx Hand-held 10 mems,LCD readout, ext mic, 12v adaptor, desktop charger, spare (dead?) batteries, weighs a kilogram at least, goes well on ext. power. **Pentium 100MHz IBM compatible desktop PC** with 1.2 gig HD, 1 44 FDD, soundblaster, external modem, Win 95, Office 97, Telstra's Easymail (free e-mail service) etc, **6El** 6mx beam, 5El 2mx beam, TV beams, ATV & UHF CB beams, medium duty rotator, 6m high pipe mast, cables, swr, CB's, old CGA monitors, working 286 laptops, color computers (WEFAX), lots of large junk-box pieces etc. Make some offers & take them away! May consider trading. Items may be seen working in Brisbane. Call Steve (vk4khq@telstra.easymail.com.au) or phone 0408-743231.

WANTED QLD

• **WWII Transmitter Receiver** Type A Mark III, also Type 3 Mark II (B2) or part sets and MCR1 Receiver. Will pay reasonable money for all suitcase receivers, transmitters from WWII. Ray VK4FH PO Box 5263 Daisy Hill 4127 ph 07 3299 3819, fax 07 3299 3821

FOR SALE TAS

• **Tono 150W** all mode 2 metre linear amp, as new $250 ono. **Yaesu MH1B8 mic**, new $50. **HF SWR/pwr meter** twin meters. Good condition $75 ono. **Kenwood TH 78A** FM Twin band h/held mint charger boom box also complete with SM33 spkr-mic BT8 dry cell case & Cig power adaptor $550 ono. David VK7ZDJ 03 6425 2030 or 0413 219 680

• **Satellite Station**, FT736R Txvr ($1500), TNC2+9600Bd Mdm ($200), Kenpro 5400B Az/El Rotators ($700), ATN X-Yagis ($100), Kenwood R600HF Rx ($350). Steve ph 0418 535 473 steve.toth@ericsson.com.au

FOR SALE SA

• **Icom IC 738** 100 Watt HF transceiver, 101 mem, ATU, handbook. Excellent condition, hardly used, in original packaging. $1500. John VK5HJ 08 8535 4278

WANTED SA

• **YAESU FT726** six metre boards and cables and connectors, 50 to 54 MHz D3øøø 237 and D3øøø 236. Geoff VK5JDZ 08 8296 7496 after 7pm QTHR

FOR SALE WA

• **Drake TR7** + PS7 100 Watt HF Transceiver, Collins 30L-1, HF Linear, MFJ 262 1 kW d/load, MFJ 962 1.5kW ATU, MFJ 262 keyer requires 8044 Chip, IC 02E h/held with speaker mike, AOR 240A h/held, Kyoritsu. K-126-B G.D.O., Sanwa Fet VOM. Bob VK6KRC 08 9277 7049

• **KLM 20M6**, 6 Element 20m Yagi , 60 ft boom, full size, like new:$1500.00 ono. **KLM 10M6**, 6 Element 10m Yagi , 30 ft boom, full size, like new:$ 800.00 ono. **Hy Gain 40m3**, 3 Element 40m Yagi, linear loaded, working order:$300.00. ono. Bill Hosie VK6ACY hosie@futurenet.co.za

MISCELLANEOUS

•If you got your licence before 1975 you are invited to join the Radio Amateurs Old Timers Club. A $2.50 joining fee plus $8.00 for one year or $15.00 for two years gets you two interesting Journals a year plus good fellowship. Arthur Evans VK3VQ or Allan Doble VK3AMD can supply applications forms. Both are QTHR in any Call Book.

•The WIA QSL Collection (now Federal) requires QSLs. All types welcome, especially rare DX pictorial cards, special issue. Please contact the Hon Curator, Ken Matchett VK3TL, 4 Sunrise Hill Road Montrose VIC 3765, tel. 03 9728 5350.

PLEASE BE KIND TO OUR TYPIST

Our Hamad typist is not an expert in your field

Please write legibly on your form, using both capitals and lower case, and use legitimate abbreviations.

This saves excessive corrections by the proofreader, and reduces the chance of errors being publisherd, which inconveniences everyone.

TRADE ADS

• **AMIDON FERROMAGNETIC CORES:**

For all RF applications. Send business size SASE for data/price to RJ & US Imports, PO Box 431, Kiama NSW 2533 (no enquiries at office please ... 14 Boanyo Ave Kiama).

www.cyberelectric.net.au/~rjandusimports

Agencies at: Assoc TV Service, Hobart: Truscotts Electronic World, Melbourne and Mildura: Alpha Tango Products, Perth: Haven Electronics, Nowra

http://www.hamsearch.com
a not-for-profit site that is a search engine for hams

• **WEATHER FAX programs** for IBM XT/ATs *** "RADFAXZ" $35.00, is a high resolution short-wave weather fax, Morse and RTTY receiving program. Suitable for CGA, EGA, VGA and Hercules cards (state which). Needs SSB HF radio and RADFAX decoder. *** "SATFAX" $45.00, is a NOAA, Meteor and GMS weather satellite picture receiving program. Needs EGA or VGA & WEATHER FAX PC card, + 137 MHz Receiver. *** "MAXISAT" $75.00 is similar to SATFAX but needs 2 MB of expanded memory (EMS 3.6 or 4.0) and 1024 x 768 SVGA card. All programs are on 5.25" or 3.5" disks (state which) plus documentation, add $3.00 postage. ONLY from M. Delahunty, 42 Villers St, New Farm QLD 4005. Ph 07 358 2785.

OVER TO YOU

The Kestrel Net

I have read the articles on this with some interest. I get the view we have several different things being discussed. So this month we continue the saga. Ed

Date: Friday, 4 February 2000 13:44

Subject: *Set the record straight.*

Having been associated with the Kestrel net for thirteen years my understanding of the naming of the net is as follows, - The yacht Kestrel was owned & skippered by Lloyd .D. Pryke, VK2PZQ a retired dental specialist, the net was formed to keep in radio contact with Lloyd during his trips round the Pacific Islands & New Zealand. I have no record of a Noel Toohey ever having been involved either on the vessel or a participant on the net. I would suggest that Kevin VK2CE check his facts, I can only assume that he has confused the Kestrel net with an earlier net on the same frequency the Castaways net though checking my log sheets for both nets I can find no call sign for a N.Toohey.

Let us be accurate.

Les Wood. VK2XG.

1927 Callsigns

Greetings once again from VK6ATE. I have today received my copy of Amateur Radio November 1999. I read with interest the paragraph on page 10 "Historic Yachtsman" with reference to Mr. F. Noel Toohey.

According to the text, Ron Fisher VK3OM has found (from pre-war Callbooks) that in 1927, Toohey had the callsign VK3CX. There is just one great problem "it just ain't so!"

To put the matter in correct perspective, no one had a callsign beginning VK in 1927. In 1927, Australian Amateurs (Experimenters) had a prefix OA (O for Oceania, A for Australia).

Ham Notes in the Radio Magazine of November 15th 1928 at page 61 explain how the new International Regulations will affect Amateurs. Amateur stations were to be called "Private Experimental Stations". The wavelengths they were allowed to use were

5-5.35, 10-10.7, 20.8-21.4, 41-42., 75-85 and 150-175 metres.

And finally —

The Australian letters are VHA-VMZ, so we can expect to have a callsign like VK2AX for an Amateur station in NSW. Presumably the Authorities will soon decide on this matter, as the new regulations *come into force in January next* (i.e. 1929 !!)

As I say –"Follow not without question the paths indicated by others, lest you end up in the garden on inaccuracy."

That said, I was nevertheless interested that Ron has access to old Callbooks and have written to him, asking for his help. Most of the information I collect comes from sources (magazines, Newspapers etc.) from within WA. I will also contact the Federal Historian asking for assistance.

I look forward with anticipation to your replies.

Dave Handscoomb VK6ATE (ex VK6NHD)

(Editors note: I have edited parts of this letter to conserve space, but not information)

WIA Division Directory

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually in their residential State or Territory, and each Division looks after amateur radio affairs within its area.

Division	Address	Officers		News Broadcasts Note: All times are local. All frequencies MHz.	Fees
VK1 ACT Division GPO Box 600 Canberra ACT 2601	President Secretary Treasurer	Gilbert Hughes John Woolner Les Davey	VK1GH VK1ET VK1LD	VK1WI: 3.570 LSB, 146.950 FM each Sunday evening from 8.00pm local time. The broadcast text is available on packet, on Internet *aus.radio.amateur.misc* news group, and on the VK1 Home Page http://www.vk1.wia.ampr.org	(F) $72.00 (G) (S) $58.00 (X) $44.00
VK2 NSW Division 109 Wigram St Parramatta NSW (Office hours Mon-Fri 1100-1400) (PO Box 1066, Parramatta 2124) Phone 02 9689 2417 Freecall 1800 817 644 Fax 02 9633 1525	President Secretary Treasurer Web: *http://www.ozmail.com.au~vk2wi* e-mail: *vk2wi@ozemail.com.au*	Michael Corbin Eric Fossey Eric Van De Weyer	VK2YC VK2EFY VK2KUR	From VK2WI 1.845, 3.595, 7.146*, 10.125, 14.160, 24.950, 28.320, 29.120, 52.120, 52.525, 144.150, 147.000, 438.525, 1281.750 (* morning only) with relays to some of 18.120, 21.170, 584.750 ATV sound. Many country regions relay on 2 m or 70 cm repeaters. Sunday at 1000 and 1930. Highlights included in VK2AWX Newcastle news, Monday 1930 on 3.593 plus 10 m, 2 m, 70 cm, 23 cm. The broadcast text is available on the Internet newsgroup *aus.radio.amateur.misc*, and on packet radio.	(F) $69.00 (G) (S) $56.00 (X) $41.00
VK3 Victorian Division 40G Victory Boulevard Ashburton VIC 3147 (Office hours Tue & Thur 0830-1530) Phone 03 9885 9261 Fax 03 9885 9298	President CEO Secretary Web: *http://www.tbsa.com.au/~wiavic/* e-mail: *wiavic@alphalink.com.au*	Jim Linton Barry Wilton Peter Mill	VK3PC VK3XV VK3APO	VK3BWI broadcasts on the 1st and 3rd Sunday of the month at 8.00pm. Primary frequencies, 3.615 LSB, 7.085 LSB, and FM(R)s VK3RML 146.700, VK3RMM 147.250, VK3RWG 147.225, and 70 cm FM(R)s VK3ROU 438.225, and VK3RMU 438.075. Major news under call VK3WI on Victorian packet BBS and WIA VIC Web Site.	(F) $75.00 (G) (S) $61.00 (X) $47.00
VK4 Queensland Division GPO Box 638 Brisbane QLD 4001 Phone 07 3221 9377 Fax 07 3266 4926	President Secretary Treasurer Office Mgr e-mail: *office@wiaq.powerup.com.au* Web: *http://www.wia.org.au/vk4*	Colin Gladstone David Jones Bill McDermott John Stevens	VK4ACG VK4OF VK4AZM VK4AFS	VK4WIA broadcasts on 1.825 MHz SSB, 3.605 MHz SSB, 7.118 MHz SSB, 10.135 MHz SSB, 14.342 MHz SSB, 21.175 MHz SSB, 28.400 MHz SSB, 29.660 MHz FM (rptr), 147.000 MHz, and 438.525 MHz (in the Brisbane region, and on regional VHF/UHF repeaters) at 0900 hrs K every Sunday morning. QNEWS is repeated Monday evenings, at 19.30 hrs K, on 3.605 MHz SSB and 147.000 MHz FM. On Sunday evenings, at 18.45 hrs K on 3.605 MHz and 147.000 MHz, a repeat of the previous week's edition of QNEWS is broadcast. Broadcast news in text form on packet is available under WIAQ@VKNET. QNEWS Text and real audio files available from the web site	(F) $85.00 (G) (S) $72.00 (X) $56.00
VK5 South Australian Division (GPO Box 1234 Adelaide SA 5001) Phone 08 8294 2992	President Secretary Treasurer	Jim McLachlan David Minchin John Butler	VK5NB VK5KK VK5NX	VK5WI: 1827 kHz AM, 3.550 MHz LSB, 7.095 AM, 14.175 USB, 28.470 USB, 53.100 FM, 147.000 FM Adelaide, 146.700 FM Mid North, 146.800 FM Mildura, 146.825 FM Barossa Valley, 146.900 FM South East, 146.925 FM Central North, 147.825 FM Gawler, 438.425 FM Barossa Valley, 438.475 FM Adelaide North, ATV Ch 35 579.250 Adelaide. (NT) 3.555 USB, 7.065 USB, 10.125 USB, 146.700 FM, 0900 hrs Sunday. 3.585 MHz and 146.675 MHz FM Adelaide, 1930 hrs Monday.	(F) $77.00 (G) (S) $63.00 (X) $49.00
VK6 West Australian Division PO Box 10 West Perth WA 6872 Phone 08 9351 8873	Acting Pres. Secretary Treasurer Web: *http://www.omen.net.au.~vk6wia/* e-mail: *vk6wia@omen.net.au*	Cliff Bastin Christine Bastin Bruce Hedland-Thomas	VK6LZ VK6ZLZ VK6OO	VK6WIA: 146.700 FM(R) Perth at 0930hrs Sunday relayed on 1.865, 3.564, 7.075, 10.125, 14.116, 14.175, 21.185, 29.120 FM, 50.150 and 438.525 MHz, Country relays 3.582, 147.200 (R) Cataby, 147.350 (R) Busselton, 146.900 (R) Mt William (Bunbury).147.000 (R) Katanning and 147.250 (R) Mt Saddleback. Broadcast repeated on 146.700 at 1900 hrs Sunday relayed on 1.865, 3.564 and 438.525 MHz : country relays on 146.900,147.000, 147.2000, 147.250 and 147.350 MHz..Also in "Real Audio" format from the VK6 WIA website	(F) $69.00 (G) (S) $59.00 (X) $38.00
VK7 Tasmanian Division PO Box 271 Riverside TAS 7250 Phone 03 6425 2923 Fax 03 6425 2923	President Secretary Treasurer Web: *http://www.wia.tasnet.net*	Ron Churcher Tony Bedelph John Bates	VK7RN VK7AX VK7RT	VK7WI: 146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.725 (VK7RNE), 146.625 (VK7RMD), 3.570, 7.090, 14.130, 52.100, 144.150 (Hobart), repeated Tues 3.590 at 1930 hrs.	(F) $88.00 (G) (S) $75.00 (X) $55.00

VK8 Northern Territory (part of the VK5 Division and relays broadcasts from VK5 as shown, received on 14 or 28 MHz).

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